

# MOTOR AGE

CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT REPAIR SHOP

FEBRUARY  
1938

## IN THIS ISSUE



### Grille Service

The new radiator grilles are pretty but perplexing—when you have to take them down. Here's how to do it.

### Short Cuts On Gear Shifters

This article will be a big help to you if you've been wondering how to go about taking apart and putting together the new automatic shifters.

### Control Over Income

A shop that doubled profits when business fell off fifty per cent. Read it and you'll realize why accounting pays.

### The New Hudson 112

A brief review of the features of this new entry to the low-price field.

# Can you tell your Ford Customers this?



**"WE USE  
GENUINE FORD PARTS"**

**"WE SELL AND INSTALL  
APPROVED FORD ACCESSORIES"**



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SAVINGS OF THE FORD  
ENGINE AND PARTS  
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**FORD MOTOR COMPANY  
DEARBORN, MICHIGAN**



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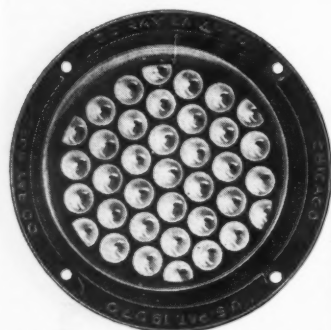
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# MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT  
REPAIR SHOP

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## MOTOR AGE

FEBRUARY 1938

### SHOP TALK

#### Accident

Of course, there is such a thing as coincidence, also there is the old saw that great minds run in the same channel—which is all preliminary to pointing out with some degree of pride, that last October I ran a story in *MOTOR AGE* which I called Super Super Service. Now I get a bunch of photographs from Paramount on their "Broadcast of 1938" which shows—you've guessed it—a Super Super Service Station. Just to show there are no hard feelings I'm using one of the photographs at the top of this page.

It would sure be tough competition to have a shop with personnel like that in your neighborhood! The difficulty with the type of filling station illustrated is that the customers couldn't make up their minds at which pump to stop.

#### Preacher

Jim Park, who repairs cars when he isn't conducting revivalist meetings in Norton, Va., takes me to task on the answer I supplied Kenneth Bristol who was having trouble with a set of Ford 60 brakes. Jim informs me that you have to be sure to adjust the brake cables to 25 lb. pull and that Ford replaces the complete shoe and backing plate assembly. Well that's once that I am O.K., as that information was also given to Ken, though it didn't appear in the Clearing House. Jim Park is a great guy, an A-1 mechanic and I imagine can preach a fine sermon. I met him some years ago at a maintenance association meeting in Camden, N. J. Shortly after that he and his wife went to Virginia to spread the Gospel.

#### Deflation

L. L. Kuhlman who hails from Patton, Mo., introduced a query on a model A Ford with the remark that he thought he was a pretty good mechanic, but was beginning to doubt it. Well, Kuhly, we all have our bad days. I remember spending two days trying to start an engine, only to find that someone had put kerosene in the gas tank—was I deflated.

#### Guesser

Just received the first news bulletin from the Indianapolis Speedway. Tickets are now on sale but it is too early to expect any of the cars at the track. Piston displacement this year will be reduced to  
(Continued on next page)

# SHOP TALK

(Continued from page 9)

274 cu. in. for the non-supercharged jobs, but if a blower is installed the displacement is limited to 183 cu. in. I'm going way out on a limb and say that last year's record of 113.589 m.p.h. set by Wilbur Shaw may be broken by 1½ m.p.h. If I'm wrong, just forget what I've written, but if I'm right, write in and tell me what a clever guy I am.

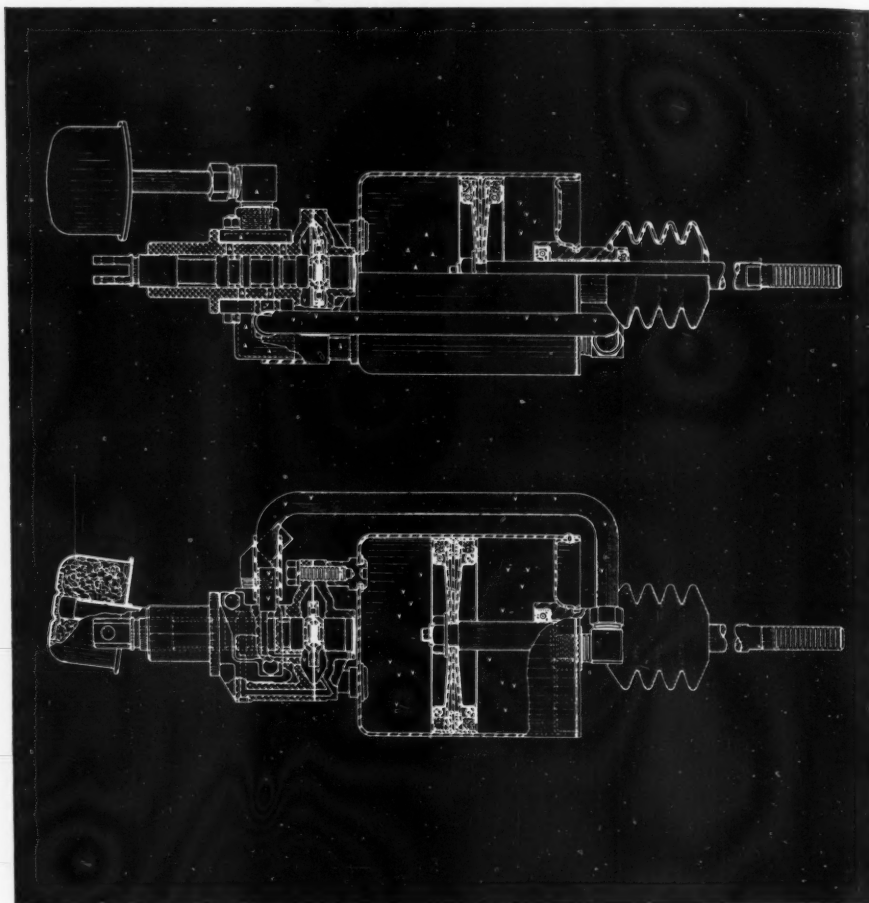
## Orchids

"On the spur of the moment, just before going to press," writes G. C. Landon of Wausau Motor Parts Co., Wausau, Wis., "we plucked out a portion of one of your articles for use in our 'New Bulletin.'" There is no need to apologize for handing me a bunch of orchids like that. I showed your letter to the boss to emphasize what a swell job I am doing.

## Trouble Shooter

I got a big laugh from a story that Joe Julian, of Bridgeport, Pa., told the other day when he stopped in to see me. It seems that a farmer out in the sticks had been having a lot of trouble with a model T. The farmer had taken both the rear and the transmission down in an effort to eliminate a noise. He was going to take the motor down next but thought he would first ask Joe to take a look at it to see if he could locate the noise which he had had for nearly a year. Joe took a ride in the jalopy and found that the trouble was caused by the front tire rubbing the fender. Imagine taking the rear and transmission down to find a tire noise—and also putting up with that racket for several months!

*Bill Toboak*



# Short Cuts on

**G**EAR shifting mechanism is not as simple as it was only a few years ago. Today there are completely automatic transmissions, electric hands and vacuum shifting units. Of this latter type, the unit used on the 1938 Studebaker is of considerable interest.

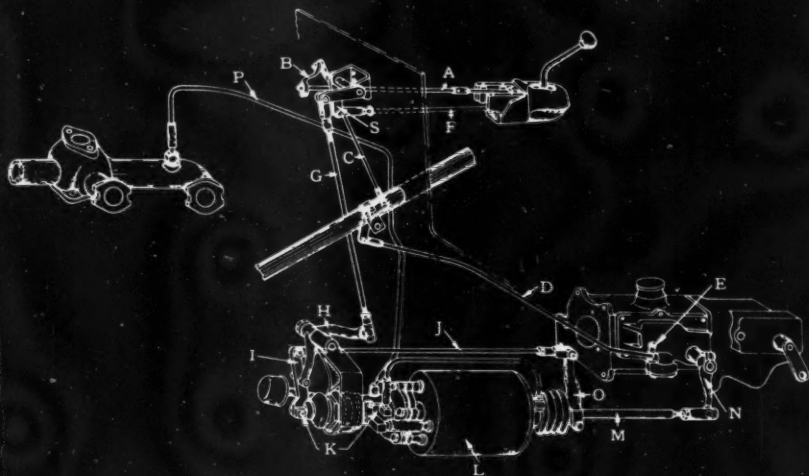
This device utilizes the intake manifold vacuum to provide the greater part of the effort required for shifting gears. The shifting lever is mounted on the instrument panel and is mechanically connected to the transmission shifting forks so that it is possible to shift gears even though the vacuum power unit is not working.

The cross shift is accomplished without vacuum assistance by moving the shift lever to the right or

the left. When moved to the left, the rod "A" is rotated counter-clockwise, which in turn moves the rod "C" downward by means of the lever "B." The rod "C" in turn actuates the bell crank on the steering column so that rod "D" and lever "E" are moved forward. This accomplishes the engagement of the low and reverse shifter rail through the mechanism within the transmission cover. To shift into high or second speed the preceding operations are reversed.

Then with the shift lever in the left neutral position and the clutch pedal depressed, the shift lever is moved to its rearward position to shift to first gear. This movement of the shift lever through rod "F" and the lever and the shaft raises





Above: Vacuum transmission control linkage as used on Studebaker President and Commander

Left: Sectional views of vacuum control cylinder.  
Upper Left: Valve in first or high gear position.  
Lower Left: Valve in neutral position. "A"—air.  
"V"—vacuum

# Gear Shifters

**Presenting All the Details on How to Service These New Units**

rod "G" and actuates lever "H." Lever "H" in turn tends to move link "I" to the rear. The link "I" pivots at its upper end because of the resistance to movement offered by the connected rod "J" and moves the vacuum control valve rod "K" to the rear. The valve operates within a very limited amount of travel. A greater part of the movement of the shift lever is taken up by the rearward movement of rod "J" which starts immediately with the operation of the valve.

This valve operates as follows:

The vacuum controlled piston in the cylinder "L" is suspended in vacuum. The valve "K" is designed in such a manner that the air is drawn equally from both sides of the piston by the intake manifold vacuum when the valve is in the neutral position.

The rearward movement of the valve rod "K" admits air to the forward side of the piston, which moves the piston and rod "M" to the rear. This movement actuates lever "N" and completes the shift to the low speed position. If the shift

is in the opposite direction, as into reverse gear, this operation is reversed. The valve "K" is so designed that its movement forward admits air at the rear of the piston moving rod "M" and the lever "N" forward to the reverse gear position.

The shift is within the control of the operator at all times. If the movement of the lever is stopped before the shift is completed, the vacuum control movement stops at the same time. For instance, if, when shifting into low gear, the shift lever movement is stopped before completing the shift the movement of lever "H" is also stopped. The air already admitted to the front of the piston momentarily continues the movement of the piston and the rod "M." Rod "J" being positively connected with rod "M" also moves slightly to the rear. Link "I" then pivots on its connection with lever "H" which is held stationary by the shift lever and returns the valve "K" to its neutral position. The air previously admitted is then immediately withdrawn and the movement of the piston stopped.

A balanced resistance to the shifting effort is provided by the small diaphragm at the rear end of the control valve "K." The diaphragm chambers are connected to the passages which lead from the valve to the cylinder "L." When the valve is in the neutral position and there is a vacuum on each side of the piston, the same balanced condition of the diaphragm exists. When air is admitted to one side of the piston, air is also admitted to one side of the diaphragm,

(Continued on page 58)



## Do You Believe in Signs?

**If You Don't, You Should — They're a Big Sales Help**

**by**  
**BERT POLLOCK**

**W**HAT do you do with signs at your shop? We don't mean the sign you have hanging out front telling the public that you're in the motor repair business, but the countless smaller signs, cards, banners, etc., which manufacturers of the products you buy send to you along with your order. The display pieces announcing that So-and-so's spark plugs are the best, that Whozit's rings give better performance, that no car is complete without a Whatsit radio, and that

it's time to change to Whatnot oil.

The manufacturer sends this advertising material to the repair man to help the repair man sell—thus, creating more sales for the manufacturer. Too often, the repair man uses it for gasket material or else throws it away. Many a repair man loudly wails that his business is small because he can't afford to advertise, yet fails to take advantage of opportunities to identify his shop with the national

*(Continued on page 50)*





# Control Over Income

by **TRUMAN MILLS**

**More profit with fewer  
customers possible with  
proper accounting**

**D**OES it pay a garage man to be "bothered" with a bookkeeping system?

"Without a knowledge of costs and a control over income and outgo provided by a good bookkeeping system, a garage man is like a ship without a rudder," declared Russell Hahn, of Hahn's garage, Dayton, O.

"When I first started in the garage business, we were fortunate enough to have plenty of customers. But then we were unfortunate, because we didn't keep proper records. At one time my partner and I did over \$60,000 business annually. But today, with half the business, I am making twice or three times as much money.

"How is this possible? The

answer is—control over what business we do. We have a complete bookkeeping system, and each month a certified public accountant takes our books, analyzes the business we have done, and shows us whether we have made any money, or where we are weak.

"This service costs \$25 a month, but is worth many times that amount, for it gives us every 30 days a complete picture of our business."

Hahn's garage has a simple, but effective control over all income and expenditures through the use of several bookkeeping devices any garage man can install with the help of a public accountant. And

*(Continued on page 53)*

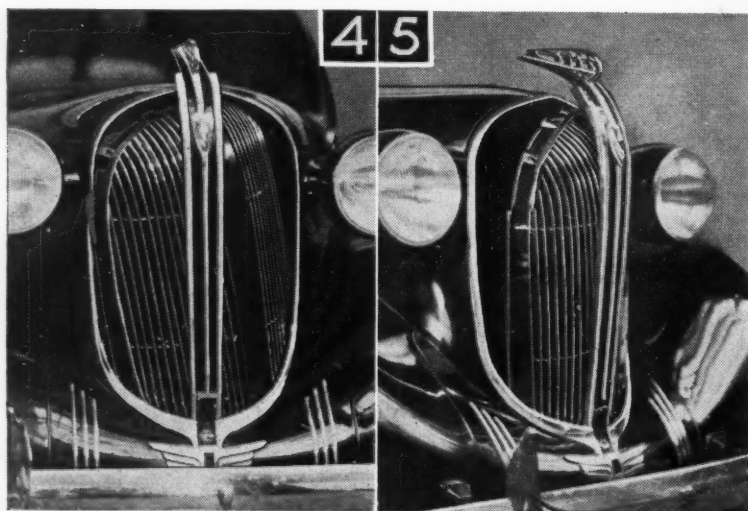
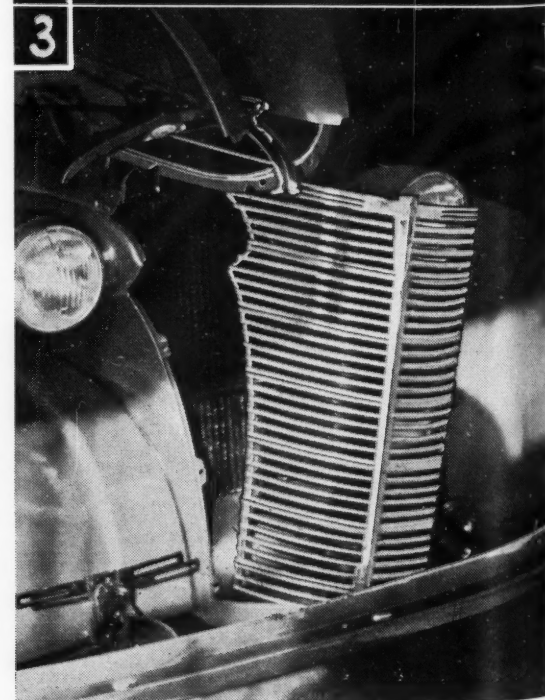
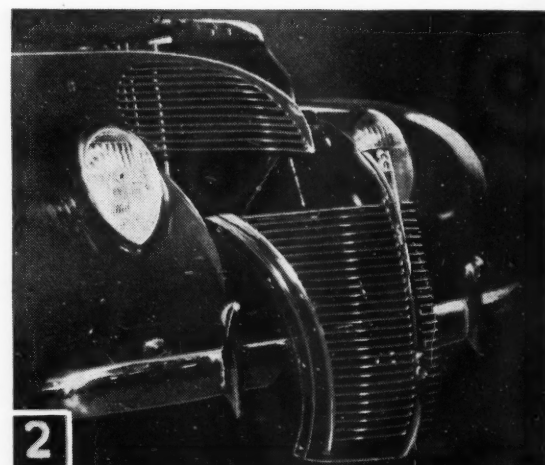
BY  
BOB HANKINSON



# Sizzling Facts On Grille S

**You won't need a can opener after reading this story—It's fresh from the grilles and a hot dish of service news!**

TO the mechanic who looks deeper than the outward appearance of the new cars, these ornamental "catch-'em-alive squirrel cages," or radiator grilles present some interesting problems. Because they will smash up, particularly when the driver pokes the nose of the car into someone else's business. And then the fun begins. To the majority of mechanics, removing and installing a radiator grille is a job that is not particularly popular, because there is always the possibility that it won't fit neatly, or that the corners will scratch the headlamps or sides of the radiator shell.







1. The Ford grille upper half is in two pieces, one of which is shown still in place. 2. The lower half is removed as one piece, as illustrated, but is supplied as two halves, bolted together at the center. 3. Chevrolet is removed as a unit—note the upper baffle which is removed first and reinstalled last. 4. Plymouth grille tips to one side after the center bar, shown in Fig. 5, is lifted out of its socket at the bottom. 6. Note the hood center strip of the Pontiac is raised to provide clearance when removing the grille. 7. Pontiac, with the grille out. Note that the lower half is a part of the radiator support shell. 8. The Pontiac radiator shell has to be removed as a complete unit, and requires removal of fenders. 9. Dodge grille is easily removed. 10. Oldsmobile grille and radiator splash shield made as a single unit.

## Service

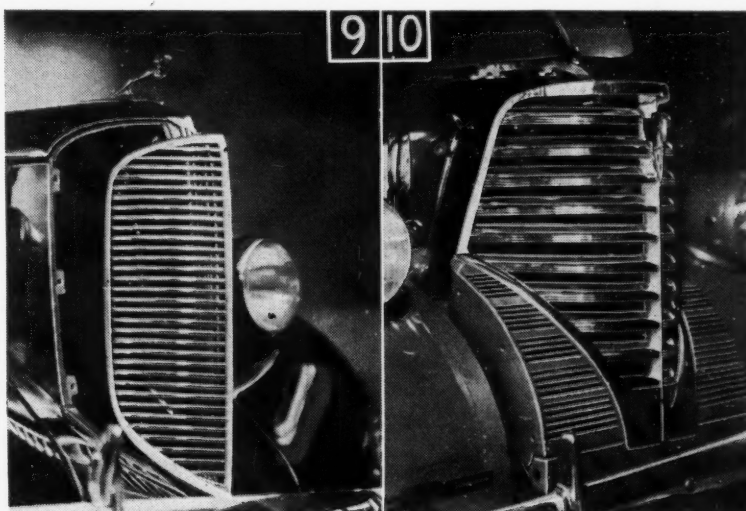
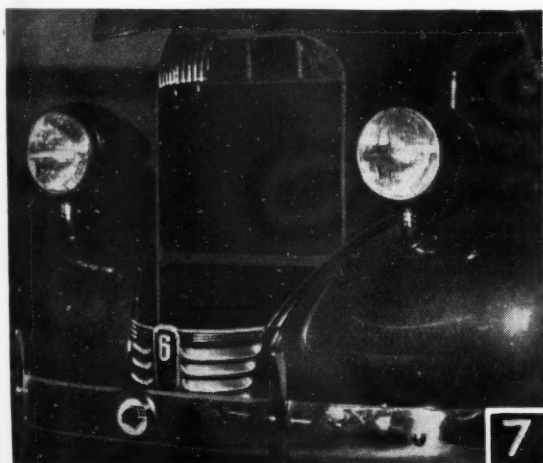
A study of the 1938 grilles to find out how they come out and go back in, reveals that it is not such a tough job, after all.

**FORD.** Both the Standard and DeLuxe Ford models for 1938 require practically the same procedure for removing and installing the grille. It is divided into three parts, with the division horizontally just above the emblem in the center of the grille, and vertically at the same point. In other words the upper part consists of two halves extending from the center around the sides of the engine compartments to the cowl panel, and replacing the conventional hood side panels. The lower part of the grille also consists of two halves, but for all practical purposes it should be considered as one piece because it is removed and installed in one piece.

The upper side pieces are removed, after raising the hood, by removing a machine screw installed vertically at the rear of the side panel, another horizontal machine screw at the radiator tank, one at the point of the "V" in front, and two wing nuts on the inside of the panel. Then the side panel may be lifted off. Repeat the operation for the other side panel.

The lower half of the grille is taken out by removing four bolts on each side which hold the grille to the fenders, and one bolt on each side of the bottom which hold the grille to the splash shield. Hold the grille at the top and pull outward

(Continued on page 42)





by  
**MANDUS  
BRIDSTON**

## Make Up for Profits

**It pays to pay attention to appearance  
says this Seattle garage**

**A** MOST interesting prestochango has taken place in the case of the Central Tire Service Co., Seattle, Wash. First, the name of "garage" has been eliminated entirely, and in its place the name "Central Tire Service Co." broadly publicized in building signs and in publicity.

Then, in lieu of gray concrete, the new face! The entire structure has been treated to a coat of con-

crete paint in a true forest green, and for accent the pilasters have insets of silver, with reliefs of Chinese red. The window sashes are finished in black. The result: A live, colorful business structure which is a far cry from the original cold, gray concrete!

Secondly, the leased shops on the ground floor have been eliminated, and in their stead, all-important customer visibility into the

maintenance shops of this garage. Ingress and egress have increased over seven times, meaning that customers find it easy to buy maintenance at Central Tire Service!

A gas analyzer and a motor analyzer are stationed strategically in the forefront and, in fact, most every maintenance department save the rebuild shop may be glimpsed on the first floor. The garage and parking departments are relegated to secondary signs, while maintenance takes first place even in the name.

"We have had a tremendous increase in business with the new set-up," reports F. B. Taylor, manager. "We have purchased new equipment for the various departments; we have attracted a personnel of which we may well be proud. And—what is just as important, we LOOK like the 'Complete Automobile Maintenance Service,' which is our merchandising motto, instead of just a place to park the car for a couple of hours. The appearance factor is all-important in maintenance merchandising.

"Modernizing as to layout and appearance is the more important in a good location such as ours, for while these factors may contribute somewhat to vitalize a business with a poor or mediocre location, they become doubly potent when applied to a good location, enabling the business to realize on volume possibilities to the fullest extent."





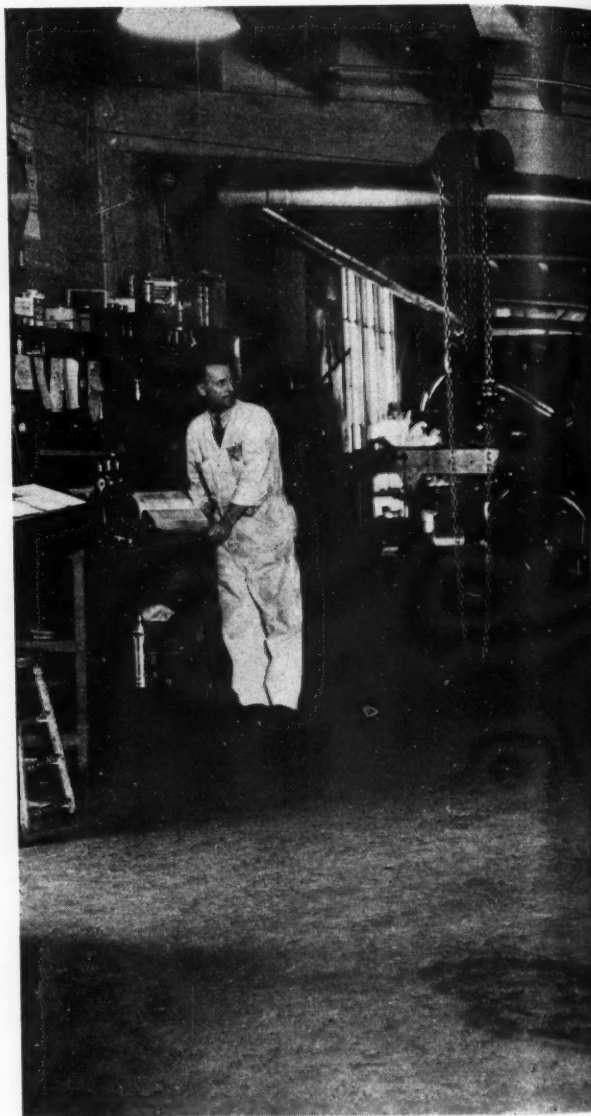
*"You were right, Mr. Jones—there were some bugs in your motor!"*

# Two Minute Success

**A Successful Repair and Maintenance Business Built on Speedy Storage Service**

*by*

**R. DeWITT MILLER**



**G**ETTING the repair business of 95 per cent of your storage customers is no mean accomplishment. Particularly when your garage has fourteen floors and a capacity of 1,000 cars. But that is the record of the Metropolitan Garage at Fourth and Spring Streets in downtown Los Angeles.

One reason given for the large amount of repair work is the speed with which stored cars are delivered to the owners. Within two minutes after the car owner presents his claim check the car is ready to be driven out of the garage.

To insure high-grade mechanical work the garage maintains a complete shop equipped to handle anything from a flat tire to a rebore job. Although open for storage day and night, all work, except reboring, complete overhauling and body

repairs requiring painting, is handled during an ordinary eight-hour working day.

If you've ever had the experience of standing first on one foot, then the other, while waiting what seemed an endless time for your parked car to be brought to you in a mid-city garage, you'll appreciate the well-merited popularity of the Metropolitan Garage. You'll appreciate, too, the smooth-running organization behind the scenes.

How does it work? Like this—John Jones calls for his car. He hands his claim check to the floor dispatcher, who determines from the number which floor the car is on. The dispatcher then checks to see which of the two high-speed two-car elevators is nearest that floor. Having started one of the elevators on its way to that floor, the dispatcher then calls the claim

number into a microphone. His voice, through an amplifier, reaches an attendant on the proper floor, who immediately takes the car from its stall and runs it to the elevator. Wide curbing between the stalls protects the car from any chance of a bent fender during the hurried operation.

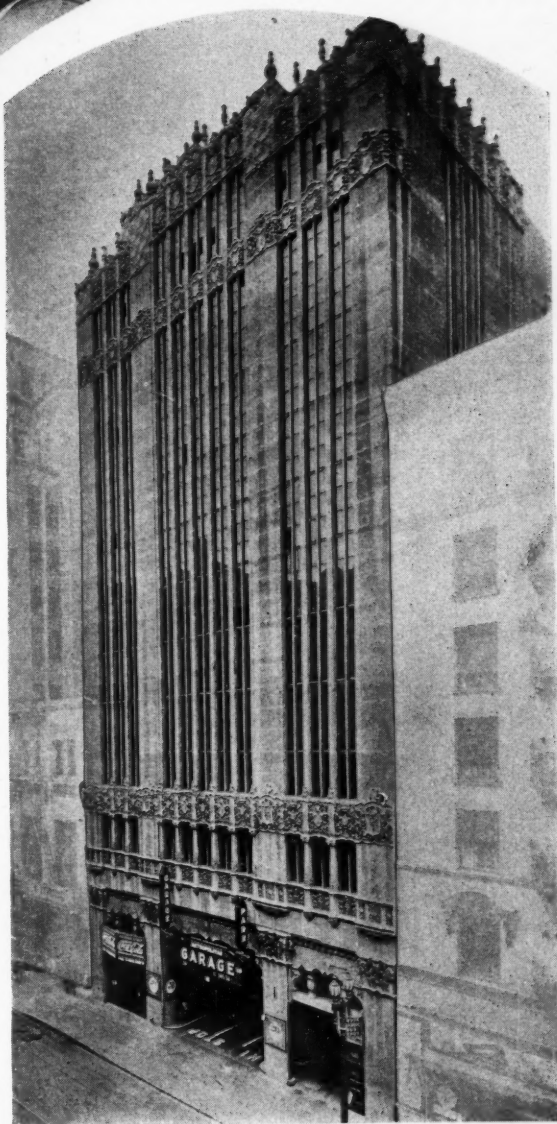
By the time the car is in place the elevator has reached the floor. It is placed on the elevator and immediately started down. The high-speed elevators can make the full fourteen-floor trip, in either direction, with a load of two cars in 30 seconds.

When the elevator stops, the turntable, which comprises most of the floorspace, swings in a half-circle, so that Mr. Jones' car is headed directly toward the exit. Mr. Jones steps in and drives off—two minutes after entering the ga-





(Left) A part of the Metropolitan's splendidly equipped shop. (Below) The attractive facade of the Metropolitan Garage.



rage and presenting his claim check.

When the car has been delivered, the attendant steps into a "man lift" and returns to his proper floor. The "man lift" is an endless belt which turns continuously in a tube about five feet in diameter. This tube runs the entire height of the building. On the rising side of the belt are board steps which automatically flop out as the belt turns at the bottom. Above each step is a hand-hold. The men step on the boards, grab the hand-holds and are transported to any floor. The belt is operated at such a speed that the men can step off at any time.

At the rush hours, between 8 A.M. and 9.30 A.M., more than 600 cars are handled. This high-speed period is repeated in the evening. During these times the second floor of the building, reached by a ramp, is used for "draining" the entire

garage. When the work gets too hot, cars are driven to the second floor, while the men return immediately to the ground floor. During the breathing spells in the rush, the cars are sorted out and taken to the proper floors. This system is particularly useful in handling the 500 cars whose owners rent stalls by the month.

The capacity of the garage is 1,000 cars but, taking into consideration the factor of daily turnover, 2,000 cars can be handled. At the present time the garage is operating close to capacity, parking 1,800 cars on an average day.

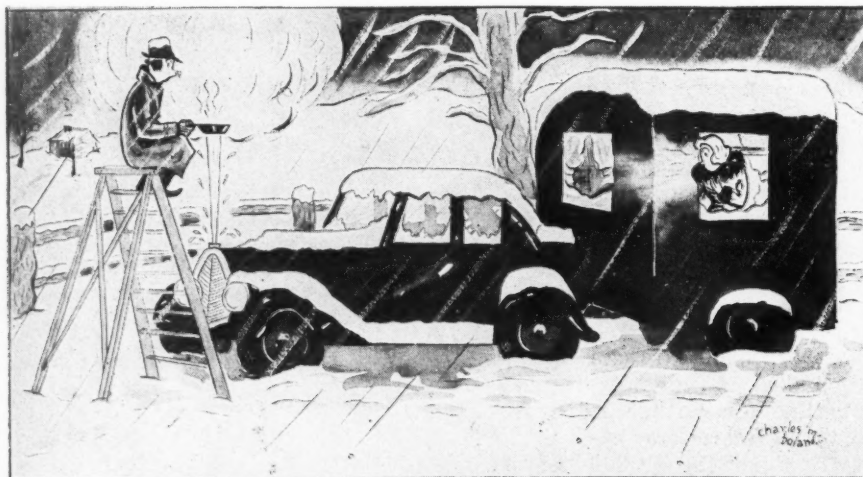


#### Studebaker Drain Holes

The drain holes through the bottom of the headlamp and fender on the 1937 Studebaker were omitted from the first cars produced and because water may accumulate in the lamp if no drain is provided, it is recommended that this point be checked. If any cars are found which do not include the headlamp drain, a  $\frac{3}{8}$  in. hole should be drilled in the bottom of each headlamp at a point 1-3/16 in. directly back of the lug provided for the headlamp door retaining screw. Then using a small punch, punch a hole through the fender by angling the punch rearwards as it is applied through the hole drilled in the bottom of the headlamp.

#### Whistles

On complaints of whistling on cars equipped with oil bath air cleaners, see that the filter plate in the cleaner is not upside down. The whistle is caused by the air cleaner—not the carburetor.



"Hurry with those eggs, dear—the coffee's getting cold!"

# Service Hints

from

# The Factories

#### Olds Windshield Leaks

In making an inspection of windshields to check for water leaks on the 1938 Olds 6 or 8, first determine if shroud ventilator cover is making positive contact with the ventilator rubber gasket. Then, determine if outer windshield division molding gasket is securely sealed at the glass and no leaks are apparent at the top and bottom ends of the windshield division molding. Next, make sure that windshield wiper transmission caps are securely sealed at the rubber gasket. Seal between the outer lip of the windshield rubber channel and body panel with pressure container using special cement.

#### Chevrolet Exhaust Manifold Valve Springs

An anti-rattle spring for use on the exhaust manifold valve shaft on Chevrolet engines has been released for service to the Parts and Accessory departments under part No. 602799. To install this spring, rotate valve weight towards the engine to "heat-off" position, and insert anti-rattle spring in slot.

In some cases it may be necessary to adjust the spring when installing. Hold the counter-balance weight on the manifold heat valve shaft 3/16 in. above the "heat-on" position and bend the spring until it just touches the stop pin.

Under no circumstances should the manifold heat valve thermostat tension be increased or any part of the heat valve assembly altered, as detonation or sticking of the valve may result.

#### Pontiac Rear Compartment

On 1937 and 1938 sedans there are metal flanges projecting below the hinges in the rear compartment. Occasionally a sharp edge may be too low and in order to eliminate the possibility of injury to hands when placing baggage in the rear compartment, these edges should be removed. To do this use a heavy pair of pliers or a hammer to bend the corners of the flange. The corners and edges should be bent toward each other to prevent breaking the welds.

#### Cadillac Steering Arm Bolt Rattle

In the event of a slight rattle occurring in the steering system of La Salle 37-50 and Cadillac 60 cars, the intermediate steering arm should be checked for looseness. Looseness at this point is generally caused by the pivot pin being loose and moving up and down on the steering arm bolt. In most cases, merely tightening the bolt at the bottom of the front cross member will eliminate the rattle. The bolt must not be drawn up too tight, however, as there is danger of stripping the threads. If moderate tightening of the bolt does not eliminate the rattle, it will be necessary to install an additional shim part No. 1300203 at the bottom of the steering arm pivot pin before tightening the bolt.

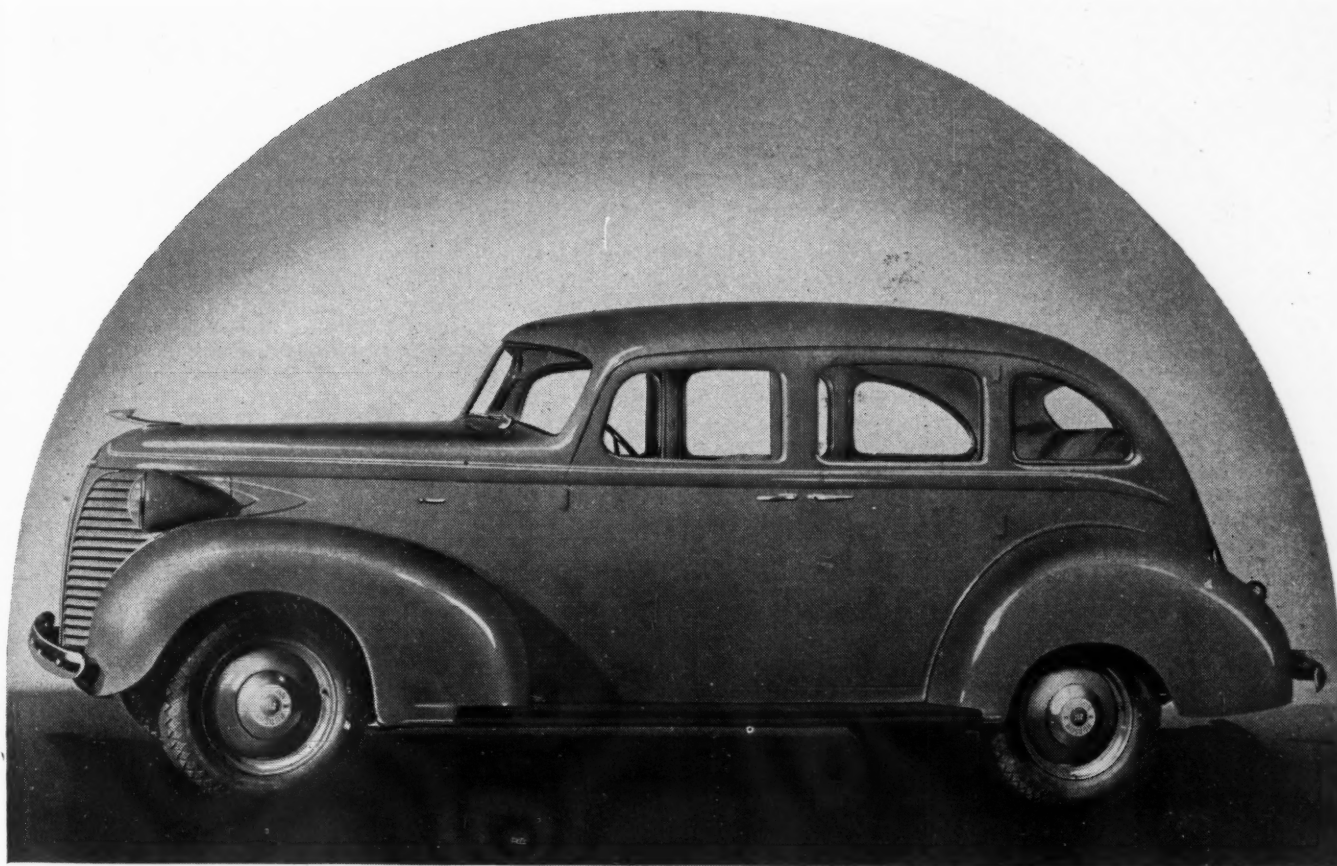
#### Studebaker Optional Cylinder Heads

Optional cylinder heads have been made available for 1938 Studebaker models in order that cars which are operated continually at altitudes above 5000 ft. will give the best possible performance. They are not recommended for cars that are operated below an altitude of 5000 ft. because of the possibility of pre-ignition, uneven engine operation and the necessity of using a premium fuel. The optional cylinder head is aluminum with a ratio of 7 to 1. This head is available for the 1938 State Commander and Commander cars from the Parts & Accessories Div. under part No. 192679.

#### Chevrolet Engine Number Location

The engine number of the 1938 Chevrolet passenger cars and trucks has been relocated. The numbers are now on a boss on the right side of the engine to the rear of the ignition distributor.





# The New Hudson 112

**Features Include  
112-in. Wheelbase, 83  
Horsepower Engine,  
Prices Start at \$694**

**T**HE new Hudson 112, which was announced to the public early in January is powered with an entirely new 6 cylinder 3 x 4 $\frac{1}{8}$  in. engine developing 83 hp. at 4000 r.p.m. with a cast iron cylinder head having a compression ratio of 6.5 to 1. Prices start at \$694 for the 3-passenger coupe.

While the line will include nine models, early production schedules are limited to four body models sedan, 3-passenger coupe, 4-passenger coupe, and a convertible brougham. The wheelbase is 112 in. or 5 in. shorter than the Hudson Terraplane.

The company claims in excess of 20 miles per gal. at car speeds of 50 m.p.h. The 1 $\frac{1}{8}$  in. carburetor is fitted with a manual choke, anti-percolating device and combined air cleaner and intake silencer. Ignition and other electrical units are of Auto Lite manufacture.

Drive to the three-speed transmission is through an oil type clutch and optional rear axle gear ratios of 41/9 and 48/9 to 1 are provided.

Smooth riding is obtained through long semi-elliptic springs, the front spring being 32 $\frac{1}{2}$  in. long and the rear spring 48 in. long. Shock absorbers are of the airplane type. Handling ease is another feature of the new car as a new roller tooth steering gear with a 16.4 to 1 reduction is used.

The bodies are of all steel construction and are mounted on a frame having a depth of 7 $\frac{1}{8}$  in. To insure stiffness the frame is of rigid box construction.

On both coupes, the swinging, split type front seat is employed. Scuff carpets replace the conventional metal scuff plates. Elbow room in the sedan rear seat totals 59 $\frac{3}{4}$  in.



Left: Airplane view of the Perfect Circle Factory at Hagerstown, Ind. Below: The post office that piston rings built. Though the population of Hagerstown is only 1400, it boasts of a first class post office as a result of Perfect Circle business.



# The House That Perfect Circle Built

by JOSEPH GESCHELIN

**E**VER since Jimmy Murphy won the Indianapolis Race back in 1922 with an engine fitted with Perfect Circle Rings, the winners of practically all major races after that time have placed their faith in Perfect Circle. Today, also, the Perfect Circle Company, of Hagerstown, Ind., bears an imposing part of the responsibility for the performance of the cars which are driven on the public roads. As evi-

dence of this fact it can be said that a check of Perfect Circle standard equipment customers indicates that thirty-seven of the fifty-nine 1938 models—or 63 per cent—are 100 per cent equipped with P-C rings, and that forty of the fifty-nine models are either 100 per cent or at least partly so equipped.

What manner of organization is it that has risen to a position of

such dominance in its line? How has it been able to scale to such heights of competitive enterprise? Like many other standard bearers of this great automotive industry, Perfect Circle developed to its present position from a modest beginning, born of the early stirrings of pioneer automobile builders. Early in 1895, five Teetor brothers organized in Hagerstown the Railway Cycle Mfg. Co. The name of this company was changed early in 1902 to the Light Inspection Car Co., and in 1914 another change in name made it the Teetor-Hartley Motor Corp. This last change of name resulted from the fact that the company had produced what was

*(Continued on page 46)*





## THE READERS' CLEARING HOUSE

of

# Service Men's Queries



**BILL TOBOLDT, Editor of MOTOR AGE, conducts the Readers' Clearing House. He presents some of the thousands of questions asked by readers of Motor Age together with a practical analysis of the difficulties in his replies. You, too, are cordially invited to send us your problems.**

### STATIC ELECTRICITY

*I had a 1936 Plymouth coupe which is continually becoming charged with static electricity. Anyone touching the car receives a shock even after it has stood for 15 minutes. There is no radio in the car. The customer has had this in his car for about two weeks and so far no shop has been able to overcome the trouble. What causes this? Shoop Motor Service, 5020 Montgomery Ave., Norwood, Ohio.*

**T**HIS is a rather common complaint. The car apparently accumulates the static electricity from its contact with the road and holds it in the frame and body of the car until such time as someone touches a metal part of the car and then the static is discharged into the person.

While it is not possible to prevent the car from picking up a charge of static, it is possible to carry the charge away from the car without shocking people. This can be done

by attaching a piece of chain to the underside of the car, preferably up under the front seat or about at the rear of the transmission, and let the chain hang down so that it will drag on the ground. This is the same principle as used by gasoline trucks, the only difference being that the chain is placed up forward instead of having it drag out in back where it is plainly seen. Naturally a passenger car owner doesn't like the idea of driving around dragging a chain behind him, but there is very little objection to the remedy if the chain is attached up under the car where it doesn't show. This is the only way I know of that this condition can be corrected.

At any rate it is worth a try because I agree that this habit of getting a shock every time you touch the car is not a pleasant one.

There is another point that you

might check, and that is the brakes. If the brakes are dragging static electricity will be generated. So check the brakes and make sure they have plenty of clearance.

### GREASE MELTER

*I have been having some trouble with a 1928 Nash Special. The rear end gets so hot that it melts the grease. Not red hot, just so you can barely hold your hand on it. It looks O.K. and doesn't make any noise. I have spaced the gears. I have loos-*

## THE READERS' CLEARING HOUSE of SERVICE MENS' QUERIES

ened them and tightened them but none of the adjustments seem to overcome the trouble. The pinion shaft gets hot. Could this be that the fibre universal joint is out of line? Could you please advise me what to do? C. T. Einspahr, Cliff's Garage, Clearwater, Nebr.

**ON YOUR 1928 Nash** that is giving you rear axle trouble, I am inclined to believe that the excess heat is caused by a sprung rear axle housing. I would suggest that you check this housing very carefully and make sure that it is not sprung and also that it has not shifted in the chassis.

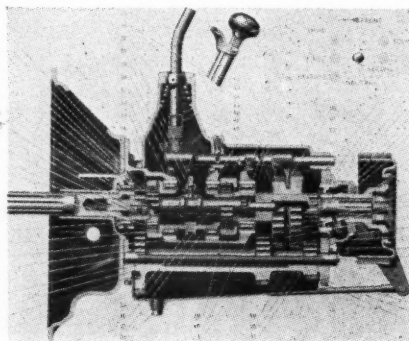
I would also suggest that you look for a sprung pinion shaft and bent axle shaft. However, I am inclined to believe that your trouble is caused by a sprung housing.

### DODGE TRANSMISSION

We are having trouble with a 1930 Senior Dodge transmission. This is a four speed forward job. It slips out of high or fourth speed. I had the transmission down and replaced the internal gear and new springs in the shift lever without results. Can you give me any information to remedy this trouble? Robert E. Lapp, 308 N. Madison St., Allentown, Pa.

**IN ALMOST every case** of this kind, the trouble is due to misalignment between the transmission and the bell housing or the rear of the motor and can be corrected by installing a half shim, usually at the bottom of the transmission, to place it in proper

alignment. The location of this shim, however, is something that will have to be determined by experiment because the cause of misalignment is not always in the same place. In other words, if you will loosen the transmission from the end of the clutch housing and install a ½ shim on the lower half of the transmission case, bolt the transmission case back to the housing and take the car out on the road to see whether this has corrected the trouble. If it has made the condition worse rather than better, it is an indication that the shim should have been placed on the top half of the transmission case rather than on the lower half.



This condition is sometimes caused by a sloppy fit of the gear but considering that you have installed a new gear, this probable cause should have been eliminated. I would also check the bearings on the transmission main shaft to be sure that they are not loose and are allowing the shaft to be deflected from a true running course.



"Hey, Fellers! A nut that you can get at with an ordinary wrench!"

### TANK CLEANER

I have discovered a very simple and easy way to clean a gasoline supply tank of dirt and moisture without removing it, which saves many hours of unpleasant labor.

On cars, trucks and buses the gas tanks are large and usually mounted at very inconvenient places to remove.

I use a gasoline filler that I have fitted with a tire valve stem. Then, I disconnect the gasoline lead line and plug at the tank, then I remove the drain plug below the tank. Now, I put the air hose on the valve stem at the filler cap and blow the tank dry. Then, replace the drain plug in the tank again and add more gasoline and repeat as before and you will have the tank free from dirt and moisture.

It is also more satisfactory to attach the gas feed line in the bottom of the tank with ½ in. of pipe extending up in the tank, which keeps a lot of dirt out of the feed line. Dale Morris, RR No. 2, Greenville, Ohio.

### INSTALL NEW MANIFOLD

I would appreciate your advice on 1933 V-8 Ford car. No. 2 and 3 cylinders on right cylinder block apparently get too much gasoline. I have just recently reconditioned the motor in this car. Installed new piston rings, new oil pump, ground valves, installed new spark plugs, exchange distributor, fuel pump, carburetor, and new distributor caps, coil and condenser and all new gaskets. Compression is normal and equal in all cylinders. All spark plugs get a wonderful good spark. Car hits and runs good until these two spark plugs drown out with gasoline. Spark plugs in other six cylinders do not foul. The crankcase oil becomes diluted with gasoline. Would dual carburetor and valve cover correct the condition on this car? I have installed another valve cover like the original one, thinking old one might leak air or have a crack in it. Is it possible to correct condition like this on V-8 car with original carburetor and valve cover chamber? Paul McGahey, Paul McGahey Garage, 102 W. Locust St., Robinson, Ill.

**THE only sure way** of correcting this trouble is to install the 1934 type of manifold which means, of course, that you will have to have the 1934 type of Stromberg Dual carburetor. Then, along with the carburetor, you will have to have the proper air cleaner.

In addition to the manifold, carburetor and air cleaner, it will also be necessary that you change the fuel pump because the 1934 model used a different fuel pump mounting. I believe that this can be done on an exchange basis, rather than having to buy a new fuel pump.

When using the 1934 type of mani-



fold, it is necessary to change the generator bracket due to the fact that its mounting was different on the 1934 model from the 1933 model. If you will look at a 1934 model and compare it with the 1933, you will readily see the difference and see why it is necessary that you have the 1934 type of generator bracket.

One last point that has to be changed is the distributor. Your 1933 distributor can be turned in on a 1934 on the usual exchange basis. The reason for this change is that the 1934 distributor governor advance is slower than the 1933 type due to the fact that more gasoline is being taken into the engine and the rate of advance has to be in proportion to the fuel consumed in relation to engine speed. If you use a 1933 distributor with a 1934 manifold and carburetor, you will run into excessive spark knock on an acceleration above 40 miles per hour.

Incidentally, I forgot to mention that when changing the carburetor it will also be necessary to change the throttle control rod and also the choke rod.

## TOWING CARE WITH THE AUTOMOBILE TRANSMISSION

Today, while talking with an insurance agent, it was brought to our attention that a car equipped with an automatic transmission cannot be pulled or towed with the front end hoisted. The car must be lifted from the rear end. If this is not done, the transmission will be injured, requiring an overhaul and considerable expense. I did not go into the mechanical aspects of this information, but took it at its face value.

If there is any damage to the front end that would indicate damage to the transmission, the car must be hoisted at the rear end and the front wheels blocked to give proper traction or else the drive shaft should be disconnected.

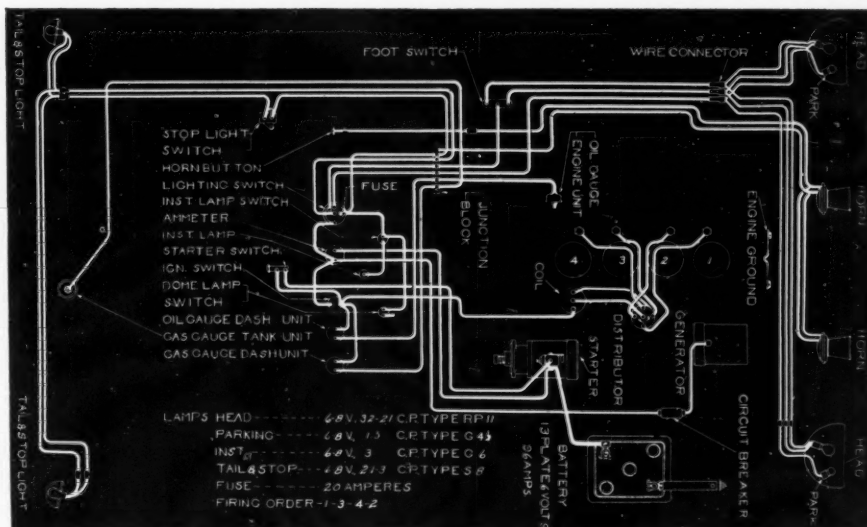
In an ordinary wreck where there is no possible damage to the transmission, if the transmission is not in a neutral position it can be towed in without difficulty. Mr. Powell, Powell Auto Wreckers, Carnegie, Pa.

## CHEVY BRAKES

Please give me a diagram of the 1937 hydraulic brakes on Chevrolet. Can you also advise how front brakes are adjusted as there are no holes in flange for adjusting brakes. C. B. Norris, Marrowbone Garage, Marrowbone, Ky.

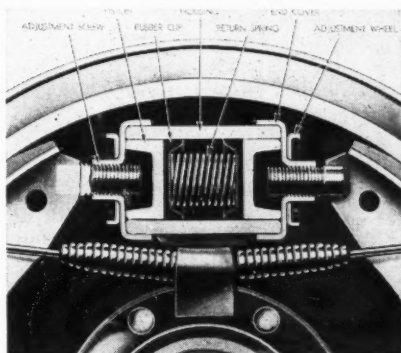
TO adjust the brakes on a 1937 Chevrolet, proceed as follows:

First, disconnect the emergency brake pull rod from the cables and then jack up the wheels so that they all rotate freely. Remove or open the



Willys-77, 1938 Wiring Diagram

adjusting hole covers on the rear brakes and, on the front brakes, remove the wheels which will permit adjustment through a hole in the brake drum.



Then insert a screw driver in the adjusting hole and engage it in the notches of the adjusting wheel. Turn the adjusting wheel clockwise until the shoe causes a slight drag on the brake drum. Then, back off four notches. Replace the adjusting hole covers and the wheels and set emergency brake lever in the fully released position. Pull on the ends of the brake cables until all slack is removed and adjust

clevis so that the holes in the clevis line up with the holes in the end of the cables. Insert clevis pins and cotter pins and tighten lock nuts.

Check the operation of the emergency brake and do not touch the hydraulic service brake adjustment to adjust emergency brakes.

## WANTS MORE SPEED

I am having trouble with a rocker arm valve in-head which was on a standard Model A Ford. A 1½-in. Winfield Model M updraft carburetor and cast iron manifold was used. This model A was clocked at 97 m.p.h.

I recently purchased this head and carburetor and assembled them on a standard Model B motor with B distributor, Winfield distributor cam and offset dowel pins.

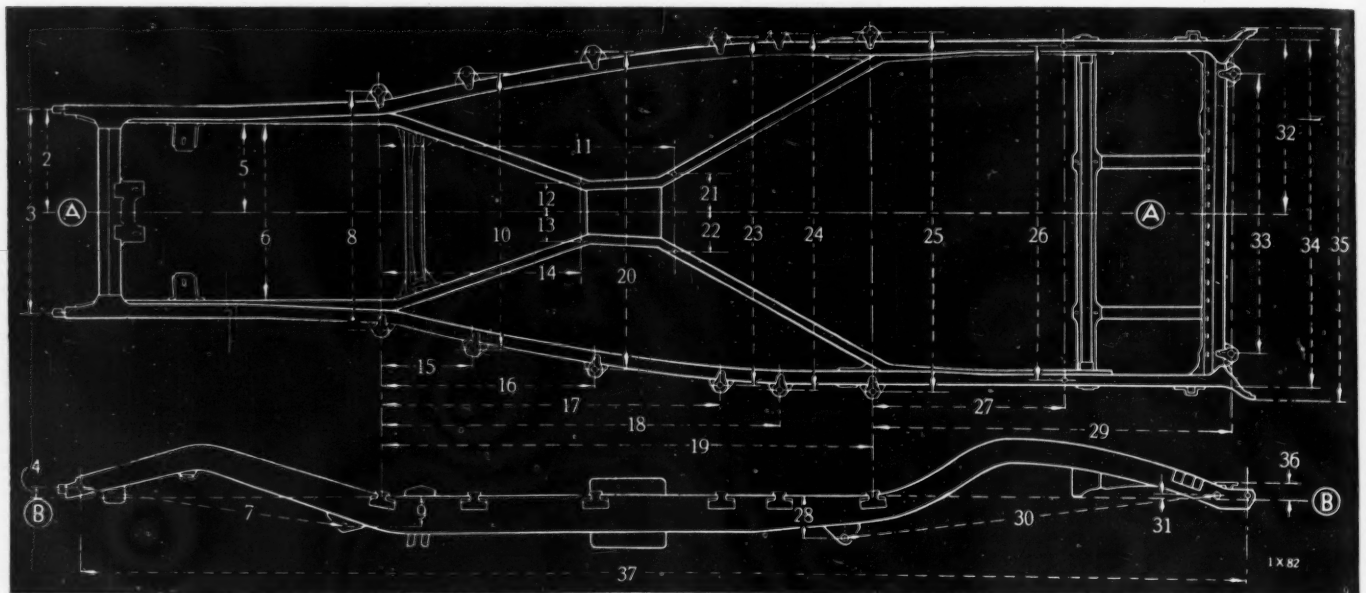
I installed new valves in the head, duplicates of the old, put in stiffer inner springs and shaved 1/16 in. off the head.

The head has fairly good pep and power up to about 55 m.p.h.—then it seems to flatten out.

I got 83 m.p.h. out of a B head and 1½ in. S.R. Winfield downdraft car-



"She said your credit was O.K.—but she just don't trust you!"



1937 Plymouth Frame Alignment

A—Center line of frame	8—33 $\frac{5}{16}$ in.	16—30 $\frac{5}{16}$ in.	24—50 $\frac{1}{2}$ in.	32—24 $\frac{1}{2}$ in.
B—Top line of frame	9—41 $\frac{1}{32}$ in.	17—47 $\frac{1}{2}$ in.	25—50 $\frac{1}{16}$ in.	33—38 $\frac{3}{8}$ in.
1—13 $\frac{1}{2}$ in.	10—38 $\frac{1}{16}$ in.	18—56 $\frac{5}{16}$ in.	26—46 $\frac{3}{8}$ in.	34—48 $\frac{1}{4}$ in.
2—27 $\frac{1}{2}$ in.	11—41 $\frac{1}{2}$ in.	19—65 $\frac{1}{2}$ in.	27—26 $\frac{3}{16}$ in.	35—51 $\frac{1}{2}$ in.
3—12 $\frac{3}{32}$ in.	12—43 $\frac{1}{16}$ in.	20—44 $\frac{1}{16}$ in.	28—6 $\frac{1}{2}$ in.	36—23 $\frac{3}{32}$ in.
4—12 $\frac{1}{16}$ in.	13—43 $\frac{1}{16}$ in.	21—51 $\frac{1}{32}$ in.	29—50 $\frac{21}{32}$ in.	37—161 $\frac{1}{2}$ in.
5—12 $\frac{1}{16}$ in.	14—28 $\frac{1}{16}$ in.	22—51 $\frac{1}{32}$ in.	30—52 in.	
6—24 $\frac{1}{2}$ in.	15—12 $\frac{1}{16}$ in.	23—49 in.	31— $\frac{1}{2}$ in.	
7—36 $\frac{5}{16}$ in.				

buretor. With the overhead I have a hard time to get 80 m.p.h.

I tried a 1 $\frac{3}{8}$ -in. S.R. Winfield down-draft carburetor with aluminum manifold without any results. A Mallory coil and condenser was installed. A California subscriber.

I THINK you made a mistake when you planed down the overhead valve cylinder head as that had already been designed with increase of compression ratio over the standard. It is my belief that you have raised the compression ratio to such a height that any available fuels will result in detonation and consequent loss in power and top speed.

I would suggest that you install two cylinder head gaskets to see if that overcomes your trouble. In addition, I would make sure that the mixture is plenty rich for the higher operating speeds.

Incidentally, when installing a head of this type, it is necessary to retard the spark over the setting used with a low compression head.

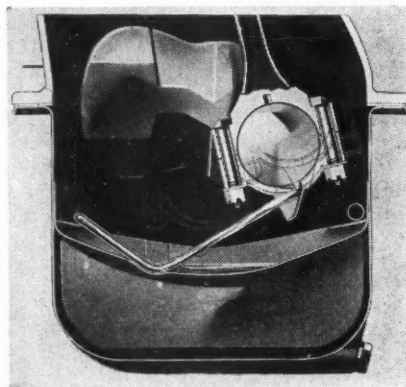
I would also suggest that you test the ignition coil on a distributor test bench and if you are using the Electrolock cable, I would suggest that you replace it with a new one.

## MISSES ON ROUGH ROADS

I have a 1936 Chevrolet Master in which we are having difficulty in finding the trouble. It will run perfectly on a good road and strike a rough road for a spell and it will start missing and foul plug No. 6. We have installed new rings with expanders and still it uses quite a bit of oil and on this rough road it starts missing and

won't pull. S. H. Combs, Service Garage, Jackson, Ky.

THE first thing I would do on your 1936 Chevrolet Master, which is using an excessive amount of oil and is missing on a rough road, would be to check the alignment of the oil spray jets in the crankcase. If these have been bent or are otherwise out of line, it will result in high oil consumption.



In addition, it would be advisable to check this engine for any oil leaks and the best way to do this is to tie a piece of oilcloth under the engine and then take it out for a good, long ride at varying speeds. Then, if you find any oil has collected in the oilcloth you can rest assured that most of your oil is being lost in leaks.

It would also pay to check the inlet valve stems and guides, particularly on number six cylinder and, if there is excessive wear at that point, it will also result in high oil consumption.

With regard to the miss, this is undoubtedly the result of a poor electrical connection and I would suggest that you carefully check your battery connections and also the battery ground connections, together with all other electrical connections in the ignition circuit.

## OUTBOARD ENGINES

I would like some data on timing rotary valves on Johnson Sea Horse and also Evenrude outboard motors. W. S. Russell, Henry Garage, Henry, Neb.

I AM sorry that in your letter you did not specify the particular models of Johnson and Evenrude motors on which you desired timing instructions.

In general, Johnson models AL, AT, LT, DT, AA, and KA have a rotary valve built right into the crankshaft and therefore do not have to be timed. Most Evenrude outboard motors have similar construction. However, there are a great many of the Johnson models which have the rotary valve as a separate unit geared to the crankshaft which, of course, have to be timed. The timing of these differs with different models and I am writing to both Johnson and Evenrude requesting that they send copies of their service manuals which will enable you to time and service these engines.

## HEAT RISERS

We are regular readers of MOTOR AGE and derive much valuable information from every issue. We did a valve grind and complete tune-up job on two 1926 Standard Buicks and





**1.** Pumping up the world's largest inner tube is quite a job for Eleanor Lowe of Miami. The tube was made for a trans-Atlantic airship.

**2.** Cinderella and her pumpkin coach was Union Oil Co.'s float in the Tournament of Roses at Pasadena. Thousands of blossoms were used.

**3.** World's largest is the claim for this truck in use at an Indiana coal mine. It is a chain-driven Mack with a capacity of thirty tons.

**4.** For sport's sake these motorized plows tunnel through the snowbound roads of Yosemite National Park so skiers may reach the hills.

**5.** London calls it a Loco-trailer. It's designed for use on road or rail and appeared at the Commercial Motor Exhibition.

**6.** Blizzards don't phase these Norwegian drivers who race over frozen lakes. Long spikes mounted on the tires give traction to the cars.

**7.** Loud howls from New Jersey motorists were heard when that state adopted compulsory examination. Seventy per cent of the cars "flunked."

**8.** Aero-sled built by Emile Guertin of Adams, Mass. It has attained a speed of 80 m.p.h. Emile hopes to organize a team of racing sleds.

**9.** New German racing motorcycle uses motorcycle frame with automobile drive shaft. Driver must lie flat to fit in the streamlined body.

**10.** Flashing light to foil holdups. Switch on floor-board pushed by driver starts light blinking on cab roof to attract attention of police.

## Estimate Year's Car Output at 5,002,188

### Above Five Million-Mark For Second Time

Factory sales of American motor vehicle manufacturers in 1937, with December estimated at 337,559, passed the 5,000,000-mark for the second time in history. This was established today when the Automobile Manufacturers Association released its regular preliminary monthly report, revealing that December shipments had enabled the industry to finish the year

with a total volume of 5,002,188 cars and trucks.

On the basis of this figure, 1937 operations were not only the second best in the industry's experience, but exceeded the previous year's volume by 8 per cent.

December shipments were 12 per cent under the previous month, and 36 per cent under December 1936.

### MEMA Monthly Index

(January, 1925 equals 100)

	Nov. 1937	Oct. 1937	Nov. 1936
Original Equipment Shipments to Vehicle Mfrs....	174	176	167
Service Parts Shipments to Wholesalers.....	121	154	139
Accessories Shipments to Wholesalers.....	136	147	96
Service Equipment Shipments to Wholesalers.....	110	130	103
GRAND INDEX (Composite) of above divisions...	156	160	150
Index Car and Truck Production.....	157	140	170
Index General Business (Bank Transactions).....	69	70	78





# Oil Companies Cutting Out the Chiselers

## Eliminating Special Deals On Equipment

Progressive repairmen will view with interest and appreciation the growing tendency of the major oil companies to get out of the service station equipment business. In other words, the oil companies will not solicit gasoline and oil business by supplying equipment on "special deals." With the elimination of such deals will go one of the major causes of price wars and other unethical business practices. In addition, it will tend to reduce the number of filling stations and thus reduce competition.

Whenever an oil company resorts to equipment deals in order to get filling stations, it not only increases the number of filling stations, thereby reducing the profit possibilities of all stations, but also the new stations obtained on that basis have little or no capital investment. It is the latter type of station that can cut prices.

Established repairmen and filling station operators should therefore encourage this attitude of the major oil companies to eliminate equipment deals.

The situation is by no means a new one and, as a matter of fact, isn't as serious as it was a number of years ago; but some of the more far-sighted oil company officials realize that conditions easily can go back to the former chaos and they are sincerely trying to do something about it.

It all began innocently enough. The oil companies were buying pumps, lifts, compressors, grease guns and other equipment for their own company-owned stations. Then came opportunities to secure additional outlets by supplying pumps at cost to desirable outlets. And when, as was often the case, several companies were competing for the same outlet the one that offered the best equipment deal got the business.

The situation has become more complicated as the large companies have been ridding themselves, at least nominally, of their own stations by leasing them to former managers. It has become further complicated by the entrance of specialty oil distributors with deals of their own on oil and lubricating equipment.

During NRA days equipment competition was effectively eliminated by the Petroleum Code and even after the Blue Eagle went the way of all flesh there was a tendency to stay away from competition for outlets through the use of equipment as the "come-on." But here and there deals began to spring up until conditions

once again began to alarm leaders in the industry who realize that the practice is one of those vicious circles such as the one that played an important part in putting saloons out of business when the Drys were in power.

So a sincere attempt is being made to call a halt. Government investigations being what they are today there is no inclination for an industry agreement on the subject or even a gentlemen's understanding. Several of the major companies have voluntarily taken the lead by issuing orders to their field organizations that equipment is no longer to be used as bait to secure new dealers. They are hoping that present dealers, equipment manufacturers, jobbers, and all other interested parties will do their part in making other oil companies see the light.

## Lockhart Engine To Run Again

Genius of the never-to-be-forgotten Frank Lockhart will return to the Indianapolis Speedway on Decoration Day when speed's royalty bid for laurels in the twenty-sixth International 500-Mile Sweepstakes.

Among the cars being groomed under the new International Formula of rules is one which will be powered by the engine driven by Lockhart in his fatal attempt at the world land speed record at Daytona Beach, Florida, on April 25, 1928.

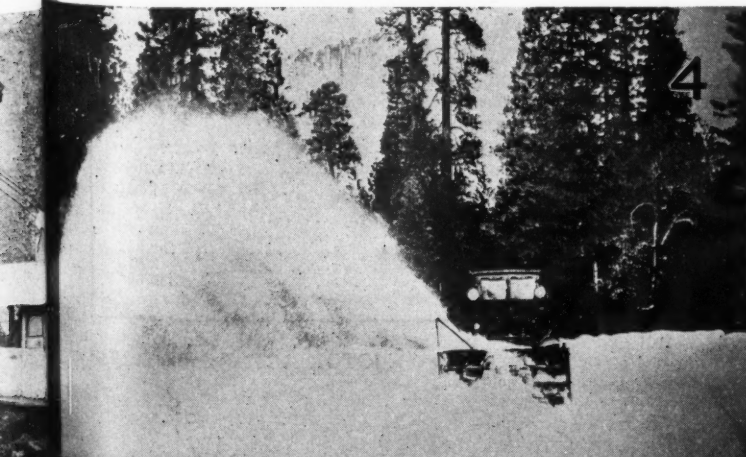
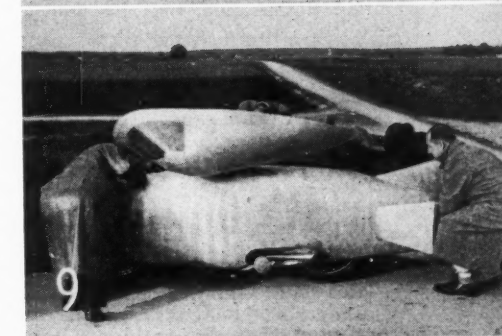
The 183 cubic inch engine from the tiny "Blackhawk"—the smallest of modern motors ever to try for the mile straightaway record—has been purchased by Alden Sampson and Riley Brett.

Who will be given the coveted driving assignment can not be predicted at this early season.

## Bernd Rosemeyer Killed

Bernd Rosemeyer, famous race driver and winner of the 1937 Vanderbilt Cup Race, was killed Friday, Jan. 28. A front tire of his Auto-Union was wrenched off while the car was traveling 275 m.p.h. on the Frankfort on the Main-Darmstadt Road. The car somersaulted twice, Rosemeyer was flung out and killed instantly.

At the time of the accident Rosemeyer was competing in speed tests for new records.





**Mobile television** station consisting of two Mack trucks containing complete television pick-up and transmitting apparatus recently presented to engineers of the National Broadcasting Co. by R.C.A. The first unit of its kind in America, this mobile station will be used for the experimental televising of outdoor sports, parades, etc.

## Jenkins to Build for New Record Attempt

Ab Jenkins, America's No. 1 speed record holder, will spend at least \$100,000 for a giant racer in which he hopes this summer to better the world land record of 311.42 miles per hour set last November at Bonneville by Captain George E. T. Eyston.

"The car will cost," he told MOTOR AGE in verifying plans for a 1938 assault on the top record, "not less than \$75,000 without the motors."

What the motors will "set him back," he said, "is something yet to be determined."

He said the car, in all probability, would be completed in the eastern United States and that he hoped to have the racing creation ready for the fall "Carnival of Speed" in which Eyston and John Cobb, fellow Englishman, will take part.

Jenkins began negotiations for motors two years ago and it is known from reliable sources that his secretive plans have been well under way for some time.

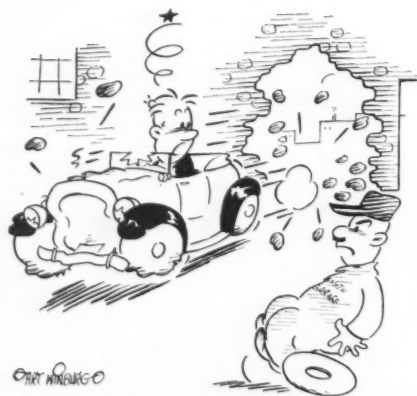
He partially lifted the curtain for a prevue on this summer's record assault when he said that his car would be somewhat smaller than Eyston's "Thunderbolt." Jenkins said that, other than that, he could not reveal further details at this time.

The trend toward smaller record cars is supported also by John Cobb, who told MOTOR AGE that he, too, is building a machine "considerably smaller" than Eyston's mount.

Neither Cobb nor Jenkins could say when they would make their record

attempts. It was understood, however, that the three record drivers—Eyston, Cobb and Jenkins—were planning for their assaults in the fall, probably September.

Cobb—while Eyston was here with his "Thunderbolt" and Jenkins set new distance records with his "Mormon Meteor"—remained in England to supervise construction of his car.



"I changed my mind about your suggestion of a steering wheel adjustment—so I came back!"

## Marvel Offers Ottowax Franchise

The Marvel Products Corp., Chicago, Ill., offers independent repair shops an opportunity to capitalize on auto waxing jobs with its Ottowax franchise plan. The Marvel Corp. leases to the repair shop an Ottowax pneumatic polishing pad, wool and cotton bonnets to fit the pad, a standard AC-DC universal motor and enough prepared wax and polish to bring back a net profit of \$108 on an original investment of \$98.50. The original investment is cut to \$53.50 if the shop already has a suitable motor.

A feature claimed for the pneumatic pad is that it will follow curves, cracks and crevices without wearing off the finish.

Time of waxing and polishing a car by this method is said to be cut to 2 to 2½ hours from the 6 to 8 hours required for doing the job by hand.

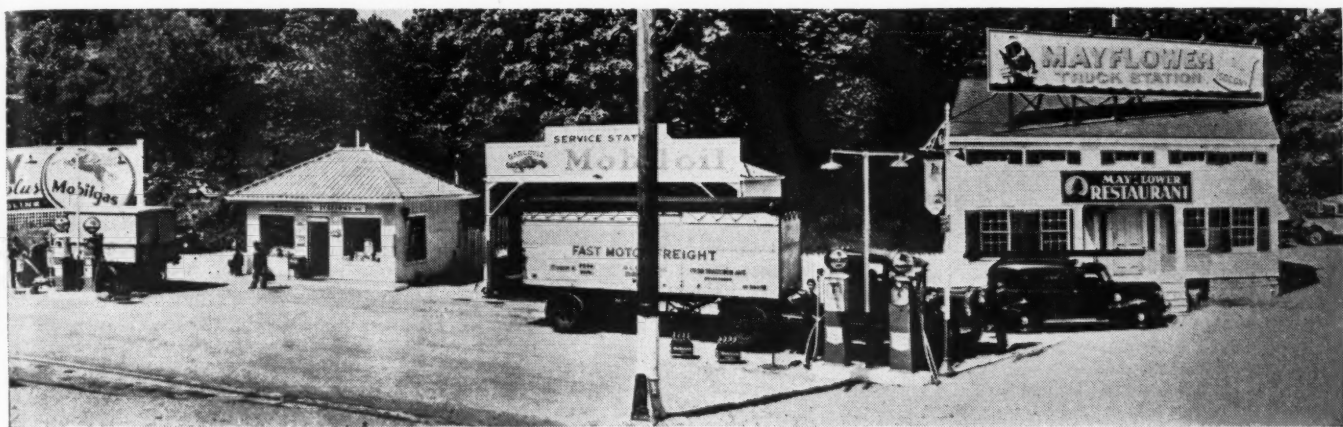
The Ottowax plan protects against price cutting and help is given the franchise holder as a portion of the leasing price is used for national advertising. In addition, display material is provided.

## Preliminary Facts and Figures of the Automobile Industry Calendar Year 1937

Compiled by Alfred Reeves, Vice President  
Automobile Manufacturers Association

Production and Value	
Car and truck factory sales, U. S. and Canada.....	4,975,000
Passenger cars .....	4,050,000
Motor trucks .....	925,000
Percentage increase over 1936.....	8%
Wholesale value of cars, U. S. and Canada.....	\$2,270,000,000
Wholesale value of trucks, U. S. and Canada.....	\$ 532,000,000
Wholesale value of cars and trucks combined.....	\$2,802,000,000
Wholesale value of parts and accessories for replacement, and service equipment .....	\$1,075,000,000
Wholesale value of rubber tires for replacement.....	\$300,000,000
Motor vehicles, accessories, service equipment and replacement of parts and tires .....	\$4,177,000,000
Registration	
Motor vehicles registered in U. S.....	29,650,000
Motor cars .....	25,400,000
Motor trucks .....	4,250,000
World registration of motor vehicles.....	42,400,000
Per cent of World's automobiles in U. S. ....	70%
Taxes	
Total motor vehicle user taxes.....	\$1,580,000,000
Gasoline taxes, federal, state and municipal.....	\$960,000,000
Employment	
Employment, in auto, auto body & parts factories.....	517,000
Weekly payroll, wages .....	\$15,500,000
Automobile's Relation to Other Business	
Automotive industry is the largest purchaser of gasoline, rubber, steel, malleable iron, mohair, lubricating oil, plate glass, nickel and lead.	
Gasoline used by motor vehicles (gallons).....	19,500,000,000
Gasoline consumption by motor vehicles, retail value including taxes .....	\$3,780,000,000
Lubricants used by motor vehicles (gallons).....	408,000,000
Motor Trucks and Buses	
Motor trucks in use.....	4,250,000
Total special motor truck taxes.....	\$410,000,000
Fleets of more than 5 trucks, number of operators.....	29,750
Number of truck drivers.....	3,175,000
Communities served exclusively by trucks.....	48,500
Motor buses produced .....	18,000
Motor buses in use.....	127,000
Motor Vehicle Retail Business	
Total car and truck dealers.....	46,250
Total repair shops .....	98,529
Total retail outlets, duplications eliminated.....	102,342
Wholesalers .....	5,913
Retail gasoline outlets .....	380,000





Key Station of the Mayflower Chain for "Signal Service"

## "Flag Stops" for Truck Drivers New Service Designed to Keep Fleet Owners in Touch With Drivers

A service station planned especially for trucks, with a hotel for drivers and a unique "signal service" for fleet owners, the first of its kind in the East, has just been opened by Mayflower Stations Inc. at Mianus, Conn. Located on the Boston Post Road at the Mianus River, 30 miles east of New York, its 24-hour program of service is designed for men as well as motors.

Drivers will be able to rest and relax at the station's hotel, which is a 150-year-old Colonial house completely modernized and comfortably furnished. Sleeping quarters, showers and a recreation room have been provided. In addition, excellent home-cooked food at reasonable prices will be served.

Mayflower Stations Inc. are dealers in Westchester and southern Connecticut for the Socony-Vacuum Oil Company.

Fleet owners and operators will be particularly interested in the "Mayflower Signal Service," which will enable a driver's home or branch office to get in touch with him as he passes on his regular hauls through Westchester and southern Connecticut.

Large signs bearing the operator's insignia will be distributed to several of the Mayflower Stations in this territory along the fleet's route and all an operator has to do to get in touch with the driver of a particular truck is to telephone Mayflower Stations' main office in White Plains, which in turn will communicate with all stations along the route the truck is following.

The individual stations will immediately display the operator's insignia in a prominently placed sign rack. In this way the driver will be "flagged down" as soon as he reaches the next Mayflower Station along his route.

## Philco Invades Low Price Auto Radio Field

In introducing its 1938 auto-radio line, Philco is invading the low-priced field for the first time in its history. Philco is placing four new auto-radio models on the market with prices starting at \$24.95.

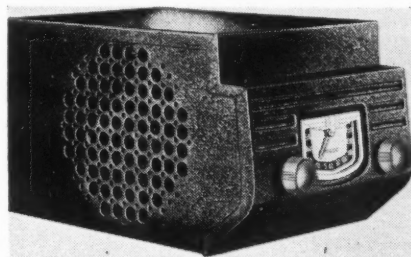
According to March Fisher, Sales Manager of the Philco auto-radio division, engineering advances have been made which enable the new Model 920 Philco selling at \$24.95, to hit a performance peak in low-priced auto radio.

The Philco Model 920, which is illustrated, will feature superior selectivity and greater freedom from interference due to a pre-selector stage and a 3-gang condenser. The Full-Wave vibrator's longevity has been increased by design changes in the Philco power transformer. A pentode audio system has been incorporated in the Model 920. New developments in shielding and triple filtering reduce to a minimum interference from inside and outside the car. No spark plug suppressors are needed with it.

Other features of the new Philco 920 are the authentic electro-dynamic speaker, full automatic volume control, five high-efficiency tubes and illuminated dial—all housed in a

maroon-colored case with built-in controls.

Fully visible reception control is a new feature of three of the four Philco 1938 auto-radio models. These three are the Philco 926 at \$39.95, the 927 at \$49.95 and the 928K at \$59.95. The automatic reception control comprises a three-button panel for speech, music and carline.



The Model 926 incorporates all the features of the Model 920 plus a full-size electro-dynamic speaker, six tubes, chromium grille and trimmings and the new Philco reception control.

Philco's offering at \$49.95, the 927, provides seven tubes and an over-size speaker as well as all the other features. Model 928K, at \$59.95 is a two-unit, seven-tube model, with the over-size speaker separately housed for widest tonal fidelity.

## Millions of \$50 Cars in U. S.

Is it possible that more than one-third of the cars on the highways of the United States have an average value of only \$50?

Can it be true that two out of every five cars in operation at the close of 1937 had a cash value of less than \$150?

These questions have been raised by a study of automobile ownership and incomes of motorists made by the American Petroleum Industries Committee. Preliminary figures indicate that 10,000,000 motorists, comprising more than one-third of the total motorists in the entire country, own and operate cars which, as a group, have an average cash value of only \$50. The figures further indicate that these motorists have incomes ranging about \$20 to \$25 a week and that, because of their limited means, most of them have never purchased a new car. To them car ownership was made possible because of low prices of gasoline and an ample supply of used cars.

## Grey-Rock Contest Under Way

The \$5,000 Grey-Rock contest of the U. S. Asbestos division of Raybestos-Manhattan, Inc., which was announced in the January issue of Motor Age, will be under way by the time this issue reaches your hands. For the best answer, in 50 words or less, to "Why Grey-Rock is the Fastest Growing Line," the company will award a first prize of \$1000.00. Other prizes varying from \$500 to \$5 and special "acknowledgement prizes" to every contestant who enters, bring the total of awards to \$5000.

The contest is open to proprietors, foremen and mechanics in garages, repair shops, service stations, brake shops, and car dealer establishments as well as foremen and mechanics in fleet operators' shops in the United States and Canada.

Formal entry blanks are being distributed by Jobbers' salesmen to whom additional prizes amounting to \$700 will be awarded for those salesmen whose names appear most often on contest entry blanks.

Judges are W. K. Toboldt, Editor, MOTOR AGE; Edward S. Babcox, President, BRAKE SERVICE; and Franklin A. Miller, of GREY-ROCK.



**Eighty-six miles of safety** on a California highway. A four-foot center lane is employed to divide the highway. The motorist who swings left of center is quickly reminded of that fact by the bumping of his tires on a series of diagonal white arrows raised an inch above the pavement level.

### **New Type Tire Cord for High Speed Truck, Bus Operation**

A new type of cotton tire cord, designed primarily to reduce heat generated at high speeds in truck and bus tires, is announced by T. G. Graham, vice-president of the B. F. Goodrich Company.

The new cord is of entirely different construction, according to the manufacturer, who states that on tests where other tires failed prematurely, tires built of this new high-flexing cord ran two and three times longer.

According to tire manufacturers high speed trucking under heavy loads increases tire temperatures tremendously causing frequent premature failure.

In the effort to offset this condition truck tires have constantly been increased in size and weight which is said to have also increased the internal heat problem.

The new tire cord perfected here gives unusual strength without bulk and materially reduces operating temperatures of tires, the makers declare.

### **Foreign Bid For American Race Drivers**

Foreign "talent scouts" plan an early visit to the United States to sign National Championship drivers for appearances in their speed classics.

Ted Allen, secretary of the Contest Board of the American Automobile Association plans to be host first to representatives from the important Grand Prix of Tripoli, to be run in Libya, Northern Africa, on May 15.

Among the early bidders for American talent, are officials of the Grand Prix of Switzerland scheduled for August 21.

While Switzerland's interest in the United States drivers is new to race officials on these shores, the invitation from Tripoli has made an annual appearance since 1934. It was in that year that Pete DePaolo and Lou Moore accepted the first invitation, and their remarkable performance impressed the North African speed merchants. Although they didn't finish in the high money, because of in-

### **1938 Plymouth Trucks**

Announcement of its line of commercial cars for 1938 has been made by the Plymouth Division of the Chrysler Corp. Three different models are offered: a commercial sedan with 105 cu. ft. capacity, a commercial pick-up truck with all-steel express box body, and a commercial car chassis with cab. Production on the new line is under way, and sample cars have been shipped to dealers throughout the country.

All models are mounted on a commercial car chassis of 116-in. wheelbase. The frame has side channels six inches deep and five cross-members, including rear engine support cross-member.

The engine used is the Plymouth L-head design, which delivers 70 hp. at 3000 r.p.m. The transmission has five ball and roller bearings; rear axles are of the hypoid type.

In the commercial sedan, the load compartment is open behind the driver's seat and is accessible from the front for side unloading, or through a steel door at the rear. Seats in all models are upholstered in leather finished fabric.

sufficient equipment, DePaolo and Moore displayed masterful driving, reports to the United States said.

It was in the Tripoli trip, when the drivers went on to Spain, that DePaolo narrowly escaped death in a crash. In avoiding two children who had run onto the road course, DePaolo hit a pole and later a wall, and spent the next few months in the hospital. He has not raced since that time.

In 1935, 1936 and again last year there were no "takers" in response to the bid from Tripoli, because of the busy Championship schedule resulting from the addition of the George Vanderbilt Cup classic at Roosevelt Raceway to the title events in this country.

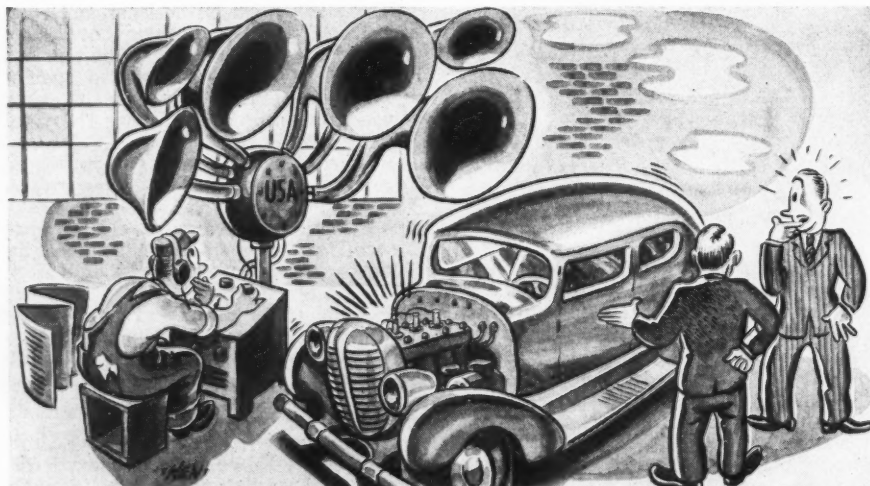
Early indications offer little encouragement that the foreign scouts may be successful in their search for drivers to make the trip to other lands. Drivers here are busy with their new cars ordered under terms of the International Formula of rules which becomes effective for the first time this year. Then, too, the drivers say, they wish time to "iron out" the "kinks" before invading strange racing territory.

The invitation to the Grand Prix of Switzerland carries the provision that only the drivers with the new type cars conforming to the International Formula would be acceptable.

While the invitation from the Tripoli officials does not make the stipulation, it is understood that only such cars would be allowed there, in view of the race's acceptance of the new rules.

### **A.T.A. ELECTS**

Fred Warrick, operator of the Congress Garage, will be the 1938 president of the Automotive Trades Association of Greater Kansas City. He was elected at the association's annual meeting December 16 to succeed Fred Lodde of Lodde Brothers, Inc.



*"He borrows it from the Army to listen to the motors!"*



## Marketing Organization for Evanair-Conditioner

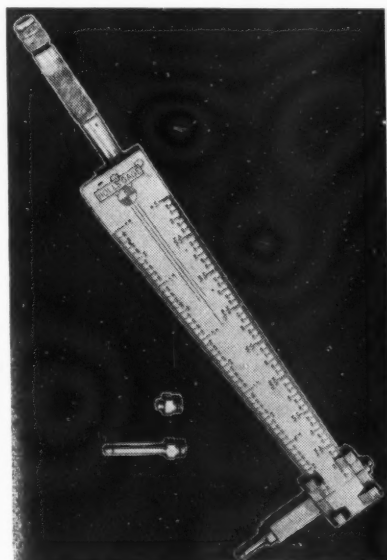
Completion of an organization for marketing and distributing the Evanair-Conditioner in the United States, Canada and the major countries of Europe is announced by E. S. Evans, Jr., executive vice-president of Evans Products Company. The new unit, which serves as a heater in winter and provides conditioned air in summer, is now in volume production at the company's Detroit plant, and shipments are under way, Mr. Evans said.

The Evanair-Conditioner was first exhibited at the New York and Chicago Automobile Shows and later at the recent A.S.I. Show in Chicago. This unit utilizes filtered outside air for both heating and ventilating. The fresh air is brought in through a louver in the hood and carried through a sealed duct to a filter and thence to a hot water core where the air is immediately heated to the desired temperature and distributed inside the vehicle. A Sirocco type blower is used, but only in the lower speed ranges as the forward motion of the car is usually adequate to draw in a sufficient volume of outside air through the hood intake louver.

## Measures Cylinder

### Diameter

A new gage known as the Holls Gage has been developed by the American Hammered Piston Ring Division of Koppers Co., Baltimore, Md. It is a direct reading, precision tool having a tapered face on either side of which is a scale. One side gives readings in thousandths of an inch and the other is sixty-fourths of an inch. A handle provides a means of adjusting the gage to the diameter



of the cylinder at any given point. Thus, a reading of the diameter, accurate to .0005 in., can be had. The gage will be supplied free in connection with a merchandising plan by American Hammered jobbers. For complete information write to American Hammered Piston Rings, Box 626, Baltimore, Md.



**On the spot** where motor accident victims meet death, Allentown, Pa., highway workers paint grim messages to warn other motorists as a means of reducing fatal crashes. Three victims were claimed at this spot.

## U. S. Classics in Internat'l Race Calendar

The "big five" nations in world automobile racing competition have listed events among the fourteen summer classics to be run under the new International Formula of rules, according to the schedule announced by the International Sporting Commission. The Commission is the racing division of the International Association of Recognized Automobile Clubs, with headquarters in Paris, France. The Contest Board of the American Automobile Association is the Commission's delegate in the United States.

Among the formula races on the card of eighty events in all parts of the world are "code" classics in the United States, England, France, Italy and Germany.

Credited to the United States under the International Formula restrictions in force for 1938, 1939 and 1940 are:

The International 500-Mile Sweepstakes at the Indianapolis Speedway on May 30.

The 300-Mile George Vanderbilt Cup race at Roosevelt Raceway, Westbury, Long Island, N. Y., July 4.

The International Calendar of races, which annually has listed a Grand Prix for Spain, does not include an event there this year, obviously because of the war.

Races outside of the United States to be run under the formula are:

May 8—Grand Prix of the Automobile Club of Tunis, France.

May 15—Grand Prix of Tripoli, Iibva, North Africa.

June 12—The Eifelrennen race, Berlin, Germany.

June 19—Grand Prix of Hungary, at Budapest.

July 3—Grand Prix of France, at Paris.

July 24—Grand Prix of Germany, at Berlin.

July 31—Grand Prix of Toulouse, France.

Aug. 7—Grand Prix of Monaco.

Aug. 14—Grand Prix on the Victor Emanuel course, Pescara, Italy.

Aug. 21—Grand Prix of Switzerland, at Berne.

Sept. 11—Grand Prix of Masaryk, in Czechoslovakia.

Oct. 1—Grand Prix at Castle Donington, in Derbyshire, England.

Races on the International Calendar for February aside from those run under the formula rules, are:

Feb. 4-6—The Lyon-Chamonix Tourist Rally, Lyon, France.

Feb. 15-20—The feminine tourist event, Paris-Vichy-St. Raphael, starting at Toulon, France.

No events are scheduled for March.

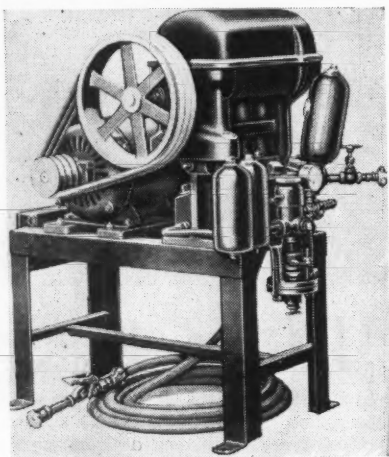
The fourteen events listing the International Formula will attract a new type of racing car and, international speed experts predict, will bring a greater representation of foreign drivers to the United States. Lack of a uniform set of rules, they say, has been responsible for an absence of European stars at American races.



**"Give this boy a hand"** was Dave Evans' unnecessary suggestion when Ralph DePalma was introduced at the Champion Spark Plug Co. convention. DePalma, veteran race driver, was awarded a plaque by Evans, president of the Champion 100-Mile-an-Hour Club, for his outstanding contribution to motor development.

## Curtis Silent Car Washer

A new hydraulic car washer has been developed by the Curtis Pneumatic Machinery Co., St. Louis, Mo. It is the triplex type (three cylinders) and provides constant and steady pressure without pulsation. The equipment is self-lubricating, with no oil or grease cups to require daily attention. The crankshaft is provided with four bearings of white metal, with shims



to permit take-up. Can be connected direct to the water supply line without danger because of an automatic pressure governor which by-passes water when over 300 lb pressure. For complete information and descriptive literature, write the manufacturer.

## Edsel Ford Queried on Railroad Deal

### Senate Committee Investigates Sale to Pennroad Co.

Edsel Ford, president of the Ford Motor Co., testified before the Senate Committee on Interstate Commerce investigating the \$141,000,000 Pennroad Corp. The committee was interested in learning what Mr. Ford knew about the sale of the Detroit, Toledo & Ironton Railroad to Pennroad in 1929. The Fords, who owned the road at that time, sold it for \$35,499,312 to Pennroad. According to A. H. Harris, vice-president of the New York Central, this figure represented about three times the actual value of the road.

"Why was it that you decided to sell the Detroit, Toledo & Ironton?" Senator Wheeler, chairman of the Senate Committee, queried Edsel Ford.

"For various reasons," answered Mr. Ford. "Times were changing and we found that due to restrictions imposed upon us by the Interstate Commerce Commission, we were unable to do many things we wanted to do in order to increase the efficiency of the road."

From the outset of negotiations involved in the transaction, Henry Ford refused to make any agreement which could require the Ford Motor Co. to route traffic over the D.T.&I. after the ownership was transferred.

The final contract of sale contained no stipulation obligating the Ford company to grant any preferential traffic business to the Pennroad.

"I knew Henry Ford," said A. J. County, vice-president of the Pennsylvania Railroad, "and I knew he would not take \$35,000,000 of our money and then gut our business the next day."

Several financing plans were suggested, but in the end all of them were thrown out because, said Mr. County, "Henry Ford wanted cash and nothing else."

Mr. County was asked if the Ford traffic was a controlling factor in the Pennsylvania's efforts to obtain control of the D.T.&I. Mr. County replied that was a very important factor. He also said the trouble in the beginning was getting the money to pay the Ford price.

"You could not get the cash and that was what led to organization of the Pennroad Corporation, isn't that the fact?" asked Senator Wheeler.

"One of the reasons, yes," Mr. County answered.

The evidence was that the D.T.&I. is still handling Ford traffic in large volume. According to the committee accountants, the D.T.&I. investment of the Fords brought them a profit of more than \$9,000,000.

## Studebaker Appoints Fletcher

The Studebaker Corporation has announced the appointment of C. S. Fletcher as Sales Manager following the resignation of L. K. Manley from that position.

Mr. Fletcher joined the Studebaker fifteen years ago in Australasia. He has represented Studebaker in Australia, China, Japan, South Africa, Europe, Canada and other foreign countries. At one time he served as sales manager of the Studebaker Canadian Corporation.



C. S. Fletcher

## Auburn Wins Skirmish

The Auburn Automobile Co., undergoing reorganization under section 77-B of the amended bankruptcy act, won its first skirmish in the Federal Court at Fort Wayne, Ind. It was ordered to retain possession of its properties instead of appointing a trustee.

The order, entered by Federal Judge Thomas W. Slick, eliminated, at least temporarily, the naming of trustee which would, according to Raymond C. Pruitt, general counsel for the Cord Corp., prove extremely expensive. Attorneys representing 512 of the 3300 stockholders also approved the order.

Auburn ceased its automobile manufacturing activities last August, and has turned to metal stamping products, and automobile parts and accessories.

## Eleven Month Summary of Automotive Business

	NOVEMBER		NOVEMBER		ELEVEN MONTHS ENDED			
	1937		1936		NOVEMBER			
	No.	Value	No.	Value	No.	Value	No.	Value
<b>EXPORTS</b>								
Automobiles, parts and accessories.....		\$ 29,799,719		\$ 21,218,061		\$ 307,135,229		\$ 211,436,023
<b>PASSENGER CARS</b>								
Passenger cars and chassis.....	24,491	15,304,295	19,918	11,739,576	202,022	118,539,304	155,310	88,635,242
Low price range \$850 inclusive.....	21,334	12,045,614	18,427	10,144,598	183,767	98,615,091	142,872	74,613,123
Medium price range over \$850 to \$1,200.....	2,834	2,657,284	1,289	1,188,681	15,351	14,499,644	10,106	9,675,310
Over \$1,200.....	202	298,249	145	222,210	2,057	3,139,306	1,542	2,304,962
Over \$2,000.....	121	303,148	77	183,787	847	2,285,263	790	2,041,847
<b>COMMERCIAL VEHICLES</b>								
Motor trucks, buses and chassis (total).....	11,444	7,099,544	7,374	3,651,063	142,976	86,770,947	95,386	49,036,933
Under one ton.....	934	396,559	884	324,411	17,916	7,244,132	14,309	5,465,946
One and up to 1½ tons.....	7,793	3,975,540	5,532	2,365,310	92,948	45,952,139	65,149	29,513,237
Over 1½ tons to 2½ tons.....	1,626	1,298,491	757	589,808	22,905	18,081,718	12,474	9,249,040
Over 2½ tons.....	1,040	1,364,381	197	360,316	7,900	14,429,583	2,572	3,887,607
Bus chassis.....	51	64,573	4	11,218	1,307	1,063,375	1,882	921,103
<b>PARTS, ETC.</b>								
Parts except engines and tires.....								
Automobile unit assemblies.....		2,860,842		2,674,690		48,384,498		36,464,087
Automobile parts for replacement (n.e.s.).....		3,109,678		2,138,658		35,003,117		24,328,700
Other automobile accessories (n.e.s.).....		510,992		308,788		4,481,932		3,066,172
Automobile service appliances.....		524,274		413,707		5,978,715		4,202,042
Airplanes, seaplanes and other aircraft.....	76	3,135,979	32	525,224	590	20,543,804	435	9,310,837
Parts of airplanes, except engines and tires.....		1,421,385		553,749		10,197,230		5,643,262
<b>INTERNAL COMBUSTION ENGINES</b>								
Stationary and Portable.....								
Diesel and semi-Diesel.....	52	244,721	36	59,758	799	2,153,977	358	970,915
Other stationary and portable.....								
Not over 10 hp.....	3,435	142,845	1,323	77,962	18,973	1,053,420	12,308	711,160
Over 10 hp.....	221	131,868	126	78,982	3,129	1,533,927	2,075	938,683
<b>Engines for:</b>								
Motor trucks and buses.....	826	101,115	1,817	175,099	28,602	2,844,577	20,226	1,979,658
Passenger cars.....	5,572	331,780	2,374	129,781	75,349	5,059,577	40,778	2,791,859
Aircraft.....	97	649,973	58	237,773	968	5,433,388	785	4,335,217
Accessories and parts (carburetors).....		216,249		152,894		2,533,487		1,778,763
<b>IMPORTS</b>								
Automobiles (dutiabie).....	107	57,569	106	74,706	1,843	1,106,135	981	590,914



## New Mack Trucks

Lighter in capacity and lower in price than any Mack trucks so far produced, two new models, the EE and the EF, rated at 12,000 and 14,000 pounds gross respectively, have gone into production according to announcement from Mack Trucks Inc.

The model EE is powered by a six-cylinder engine with  $3\frac{1}{2}$ "x4 $\frac{3}{8}$ " bore and stroke developing 75 h.p. at 2800 r.p.m. Total piston displacement is 253 cu. in. The model EF has a  $3\frac{3}{8}$ "x4 $\frac{3}{8}$ " powerplant which develops 78 h.p. at 2800 r.p.m. and has a piston displacement of 271 cu. in. The fully counterbalanced crankshafts of both these new models have seven bearings and are of drop-forged, heat-treated carbon steel. Cylinders are cast in block with detachable one-piece head and cylinder blocks are of chrome nickel. Both models are of L-head arrangement with exhaust valve seat inserts.

The drive on both the models EE and EF is from a dry single plate clutch through a four-speed, selective, unit-with-engine transmission, a five-speed transmission direct in fifth being available at slight extra cost. Final drive on both models is of the single reduction type. The EE has two available ratios, 5.14 or 5.66, the EF having three ratios of 4.85, 5.83 or 6.80. The model EF also has a double reduction axle available at slight extra charge. All rear axles are full-floating employing Hotchkiss drive.

Both models have chassis frames of pressed carbon steel with side members 7-15/16" deep, 7/32" thick and a 3" flange. Cross members are five in number, three being of the box girder type.

## 211,772 New Pontiacs in '37

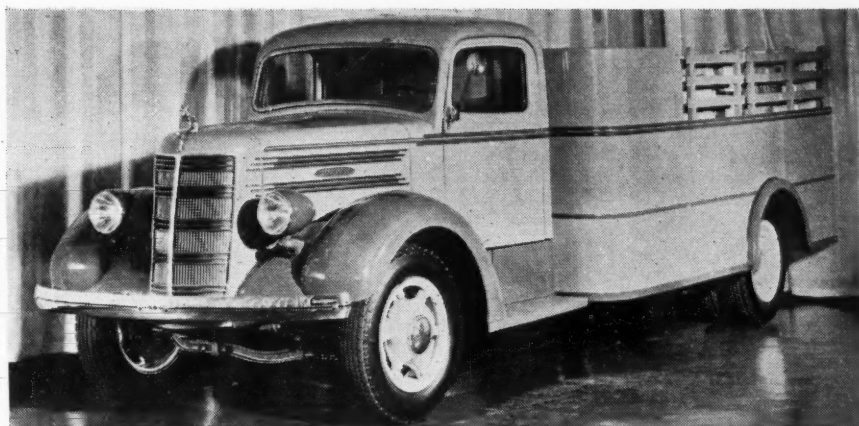
During the 12 months ending Dec. 31, Pontiac dealers in the United States delivered 211,772 new cars and 393,700 used cars, an appreciable increase as compared with 178,931 new and 327,842 used cars sold in the calendar year of 1936. Largest previous year's sales of new cars totaled 196,096 in 1928.

A comparison of sales throughout the world by model year instead of by calendar year shows sales of 1937 model Pontiacs totaled 236,189, while in 1936 they were 173,137.

In 1936, Pontiac registered 5.7 per cent of the business nationally except that in the high price brackets. In 1937 the percentage increased month by month with 8.12 per cent of the business in October and 8.24 per cent in November, giving a national figure for the year 1937 of 7.05, highest in Pontiac's history.

### I.A.A. Elects Committee

Duke Pearsall, president of the Illinois Automotive Association, has named the following to serve as committee chairmen during 1938: Membership, Lester Hesse; Publicity, James A. Wheatley; Finance, Walter Breytspraak; Entertainment, L. T. McAuliffe; Ethics & Welfare, John L. Heckman; Program & Attendance, George Unverzagt; Special, Lou Guenther; and Show, G. A. Brunelle.



New Mack model EE Truck rated at 12,000 lb. gross

## Senate Group Sanctions \$50,000 Expenditure for Investigation Approves Manufacturer-Dealer Probe

The Minton resolution calling for an expenditure of \$50,000 by the Federal Trade Commission in investigating manufacturer-dealer relations in the automobile industry has been approved by the Senate Interstate Commerce Committee.

If finally approved by the Senate, the FTC will be authorized to determine if present manufacturer-dealer contracts are "fair and equitable," if dealers can earn a reasonable profit, and if manufacturers "employ coercion to the detriment of the dealer, the consumer and the public."

Both General Motors and Chrysler have written to the House sub-committee, which was named to consider a similar resolution sponsored by Representative Withrow, who recently asked spokesmen for the two companies to submit figures on "dealer mortality."

R. H. Grant, vice-president of General Motors Corp., advised Chairman Crosser of the sub-committee that no specific information on the subject is available although he submitted an analysis of "dealer changes" resulting from a variety of causes ranging from retirement and business failure to cancellation of contracts by the manufacturer.

B. E. Hutchinson, chairman of Chrysler Corp.'s Finance Committee,

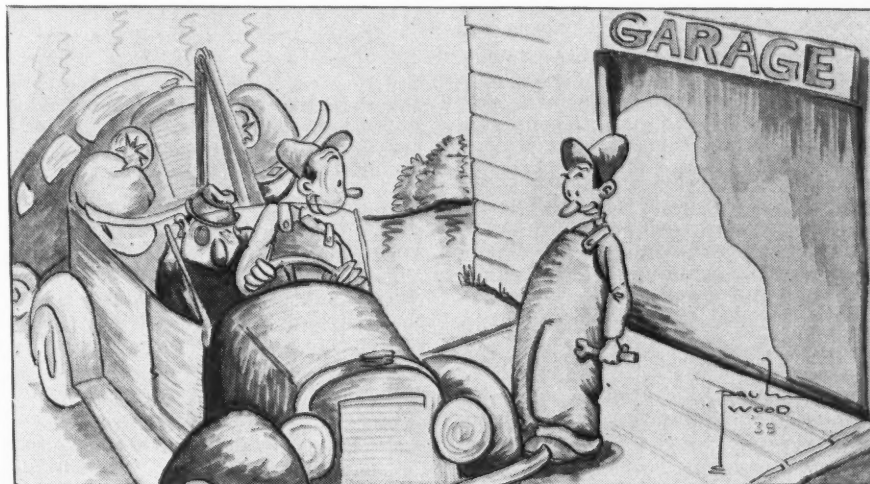
also wrote the sub-committee that the information asked for is scarce but he disclosed the results of a questionnaire circulated among Chrysler dealers in Wisconsin, Withrow's own State.

Hutchinson warned the sub-committee that when a dealer changes from one line of cars to another, that it should not consider that the dealer is "going out of business."

## K-D Announces Electric Flare



The K-D Lamp Co., 610 West Court St., Cincinnati, Ohio, has just placed on the market one of its newest devices, an electric flare. The flare is moisture, dust and fool-proof, with Fresnel type lens such as is used in lighthouses, emitting horizontal ribbons of light. The lens holder fastens to flare against a cork gasket which forms a protection against vibration, handling, dust or moisture. It is also equipped so that flag holder and flag may be snapped over the top of the lens.



"He was going to a fire—and he damn near got there!"

## GM Sales To Consumers Off 125,998 in '37

December sales of General Motors cars to dealers in the United States and Canada, together with shipments overseas, totalled 160,444 compared with 239,114 in December a year ago. Sales in November were 195,136. Sales for 1937 totalled 2,116,897, compared with 2,037,690 in 1936, an increase of 3.9 per cent.

Sales of General Motors cars to consumers in the United States totalled 89,682 in December compared

with 173,472 in December a year ago. Sales in November were 117,387. Sales for 1937 totalled 2,116,897, compared with 1,720,213 in 1936, a decrease of 7.3 per cent.

Sales of General Motors cars to dealers in the United States totalled 108,232 in December compared with 197,065 in December a year ago. Sales in November were 153,184. Sales for 1937 totalled 1,680,024, only slightly less than 1,682,594 in 1936.

### GM SALES TO CONSUMERS IN UNITED STATES

	1937	1936	1935	1934
January .....	92,998	102,034	54,105	23,438
February .....	51,600	96,134	77,297	58,911
March .....	196,095	181,782	126,691	98,174
April .....	198,146	200,117	143,909	106,349
May .....	178,521	194,628	109,051	95,253
June .....	153,866	189,756	137,782	112,847
July .....	163,818	163,459	108,645	101,243
August .....	156,322	133,804	127,346	86,258
September .....	88,564	85,201	66,547	71,648
October .....	107,216	44,274	68,566	69,090
November .....	117,387	155,552	136,859	62,752
December .....	89,682	173,472	122,198	41,530
Total .....	1,594,215	1,720,213	1,278,996	927,493

## Gus Schrader 1937 I.M.C.A. Champion



Gus Schrader

Gus Schrader, Cedar Rapids, Iowa, dare-devil, won the 1937 dirt track championship, scoring the greatest number of points for the fifth consecutive year on the International Motor Contest Association circuit. Schrader scored 1120 points against his arch rival, Emory Collins, who trailed a close second with 1020 points. Buddy Callaway, Miami, finished in third place, besides winning the I.M.C.A. Southern Championship.

Both Schrader and Collins piloted Offenhauser specials, while Callaway wheeled a six cylinder Curtis airplane motored job. Callaway ranks as one of the few drivers who has consistently raced in the money with a six cylinder car.

John Sloan, Jr., who heads the Racing Corporation of America, successfully promoted 70 days of racing

the past season under the sanctioning body of the International Motor Contest Association. Founded in 1914, the I.M.C.A. stands as the oldest and largest independent racing association in the country, and each year it sanctions auto races at the leading state and district fairs throughout the United States and Canada. During 1937, 159 drivers were registered in the I.M.C.A.. The aggregate purses for the past year on the I.M.C.A. circuit totaled \$81,425.00.

According to Mr. Sloan, contracts have been signed for many state fairs in 1938 and the Racing Corporation of America expects to run 90 days of racing with approximately 200 registered drivers.

## Gilmore Yosemite Economy Run

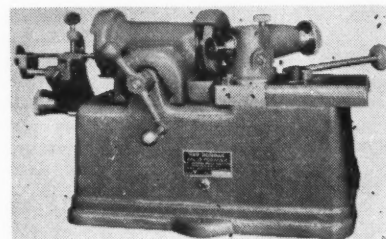
While the "sweepstakes awards" for the Gilmore - Los Angeles-Yosemite economy run are of considerable interest, the placement of the other cars is also of considerable interest. Cars were classified in accordance with the delivered price in Los Angeles and winners of each class were declared in accordance with the average ton miles per gallon of gasoline made during the 314.5-mile run.

Regardless of class, the Graham Six supercharged had the highest ton miles per gallon of gasoline, while the Willys four delivered the highest average miles per gallon of fuel. Gilmore fuel and lubricants were used by all cars throughout the run.

Class	Pos.	Make	Type	Tot. Oil Used	Avg. Miles Per Hr.	Avg. Miles Per Gal.	Avg. Ton Miles Per Gal.
A	1	Willys 4	Sedan	..	29.08	30.53	48.90
	2	Willys 4	Sedan	..	29.08	29.39	47.18
	3	Willys 4	Sedan	..	28.85	28.08	44.93
B	1	Ford "60"	Sedan	1/2	28.94	28.85	50.77
	2	Chev. 6	Sedan	..	29.17	21.99	43.49
	3	Plym. 6	Trg. Sedan	3/4	33.82	21.25	40.46
C	1	Hudson Terra. 6	Sedan	..	29.81	25.78	50.46
	2	Nash Lafayette 6	Sedan	..	33.64	22.31	48.84
	3	Pontiac 6	Sedan	..	29.72	21.84	47.09
	4	Dodge 6	Sedan	..	28.99	21.11	42.11
D	1	Pontiac 8	Sedan	..	29.81	20.97	46.76
	2	DeSoto 6	Trg. Sedan	..	32.31	20.69	42.87
E	1	Stud. 6	Sedan	..	30.93	24.38	51.81
	2	Olds. 6	Trg. Sedan	..	30.19	19.18	41.60
F	1	Nash 6	Sedan	..	30.68	23.65	53.56
	2	Graham 6	Trg. Sedan	..	30.44	24.76	52.95
	3	Hupmobile 6	Sedan	..	31.98	21.84	48.07
	4	Packard 6	Trg. Sedan	..	29.48	20.29	45.25
	5	Olds. 8	Trg. Coupe	..	30.00	19.06	43.32
G	1	Hudson 8	Trg. Sedan	..	29.12	22.79	49.41
	2	Nash 8	Sedan	..	31.04	19.68	47.57
	3	Stud. 8	Sedan	..	32.26	20.69	46.97
H	1	Graham 6	Trg. Sedan	..	30.05	25.78	55.93
	2	Hupmobile 8	Sedan	..	30.73	20.56	49.27
I	1	Lincoln Zephyr 12	Sedan	..	29.30	23.47	54.74
J	1	Packard 8	Trg. Sedan	..	29.26	16.21	46.54

## New Valve Refacer

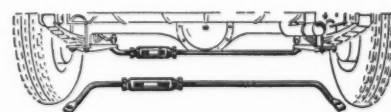
A radically different and mechanically new valve refacer, known as Model Y, is now being introduced by the Van Norman Machine Tool Co., Springfield, Mass. This new machine takes any valve from 5/16 in. to 11/16 in., and does a fast, accurate job of refacing with a 5-in. wheel that is driven by a 1/3-hp. motor. Among



the noteworthy features of this new model is the construction of the wheel slide assembly, which has self-adjusting dove-tail ways, and pre-lubricated totally enclosed bearings on the wheel spindle. Also a turret-top workhead which is dowel-pinned and adjustable to 30, 45 and 90 degrees.

## Spring Saddle Silencers

One of the latest products of the Tiger Timer Co., S. Acton, Mass., is their Tiger Spring Saddle Silencers. This device consists of a sturdy bar

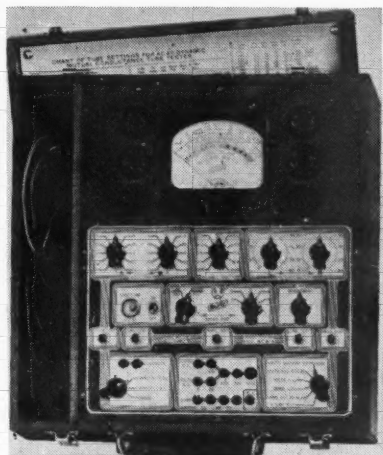


and a turnbuckle, the bar being connected to the rear spring saddles and adjusted by the turnbuckle so as to eliminate rumbles caused by spring saddles shifting on the housing.



## Radio Tube Tester

One of the latest products of the Hickok Electrical Instrument Co., Cleveland, Ohio, is their Model AC 51X dynamic mutual conductance tube tester. This instrument is furnished complete with test leads and a chart showing proper tube settings for various types of radio tubes. It is an all-purpose tester and is particularly suited to the testing of automobile radios. In size, it is 14 in. x 13 3/4 in. x 6 in. deep, has a sloping panel and



is furnished in a hardwood case with walnut finish. The case is equipped with a handle, making the instrument easily portable. Dealer's net price—\$59.40.

## Willys Plans

### Foreign Assembly

Plans for assembling Willys passenger cars and trucks in several European countries are announced by Ralph J. Archer, vice-president and manager of the Willys Export Corporation, on his return from a business trip abroad.

The new assembly plans, which Mr. Archer said will reduce the cost of delivering Willys cars in Europe, will be completed within the next few months.

It was not stated specifically in which countries the new assembly operations would be established. However, it was said, there will be assembly operations in all European countries where an appreciable volume of Willys sales are being made.

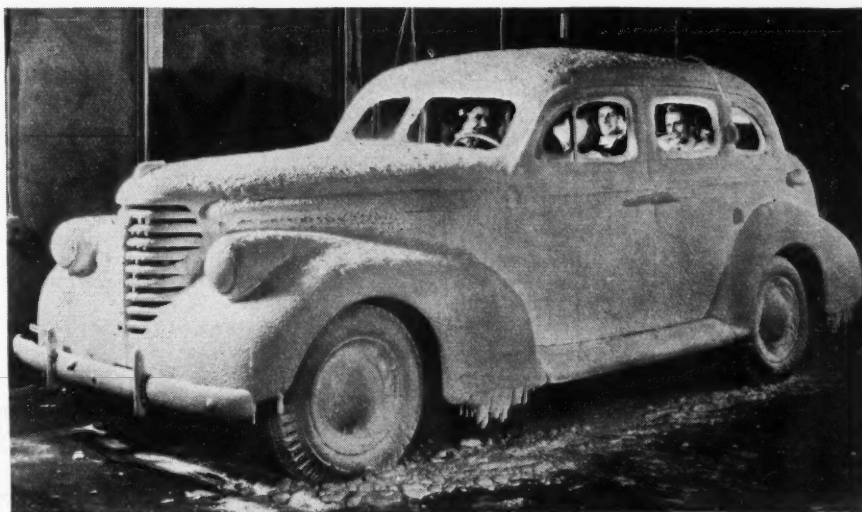
## Glycerine-Litharge Cements Quickly Prepared for Lasting Repairs

Strong permanent repairs can be made at short notice if the ingredients of glycerine-litharge cements are kept at hand. A general method for preparing the cement consists of mixing six parts of pure glycerine with one to three parts of water and sufficient litharge (lead oxide) to form a paste of the desired thickness. If preferred, the water may be omitted. Mix the cement just prior to use, since it sets rapidly, within an hour or so.

A more specific formula for making a cubic foot of the cement requires the combining of 23 pounds of lith-

arge and 5.25 pounds of 90 per cent pure glycerine. Addition of about 10 per cent of such materials as iron oxide, Fuller's earth or silica, will delay the setting time somewhat, without affecting the final hardness or strength.

These glycerine-litharge compounds are unique in their ability to withstand the action of most corrosive solutions and dilute acids. They are highly resistant to moisture and heat and stand temperatures of 200 deg. C. or more. The cement takes a good finish and paint adheres well.



Photographers shivered in sheepskin garments and felt-lined boots as they arranged cameras and floodlights in the 10-below temperature of Oldsmobile's "cold room," occupants of an Oldsmobile car relaxed in mid-summer warmth during a recent test of the new front and rear hot-water heater combination developed especially for use in the four-door sedan models of the Oldsmobile Six and Eight.

## SAE Detroit Annual Meeting Attracts 1100

Air conditioning, acoustical research, performance requirements for trucks, future legal regulations related to passenger cars, cylinder wear, fuels, and Diesel engines were subjects of paramount popular appeal at the annual meeting in Detroit of the Society of Automotive Engineers. The first two subjects were transferred from a conversational stage to definite automotive engineering functions for most of the more than 1100 members and guests who registered for the meetings.

Distinguished by vivid and "popularized" presentations of technical subjects individual sessions drew a high average of attendance and broke down traditional divisions of interest as between the various professional activity groups of the society.

Motor vehicle administrators of the United States and Canada joined in presenting through Charles A. Hartnett, New York's commissioner, a symposium of their views of the design factors in motor vehicles which have a bearing on highway safety.

Nearly unanimous on such questions as their disapproval of poor visibility in 1938 automobile design, approval of safety glass in all lights,

and the desirability of dual windshield wipers, the administrators reflected divergencies of opinion on such subjects as the governors to control maximum speeds, and the question of headlight types and controls.

## Rajah Solderless Coupling

The Rajah Co., Bloomfield, N. J., has designed a solderless coupling for installing new ignition cables on cars, trucks and buses which have their cables in conduits. Its purpose is to facilitate the removal and installation



of the cable within the conduit. It operates by turning a pointed screw into the end of the old wire, attaching a new cable in a like manner to the other end of the coupling after which it is possible to draw out the old wire and draw in the new one in a single operation.

## K-D Piston Ringer

The K-D Mfg. Co., Lancaster, Pa., has just announced a new tool for removing and installing all makes and sizes of piston rings. It is claimed

that the Piston Ringer prevents cut fingers and damage to rings. The tool is small in size and easy to operate. For complete information and prices on the No. 875 Piston Ringer, write the manufacturer.



## Ford Passes Million Car Mark Again

The second best year since 1930 was enjoyed by Ford Motor Company in 1937, according to announcement made at the Ford home offices in Dearborn, Mich.

Ford world sales and world production figures showed both exceeded the million-car mark for the twelfth year since 1920, the first year Ford production passed the million mark.

Total Ford world production in 1937 was 1,314,369 units. This total

was exceeded during the decade only in 1930 and 1935.

Of the total Ford world production last year, the larger part, or 1,027,701 units, were produced and assembled in the United States. To this Ford production in Canada and assemblies in British dominions and other territories added 78,874 units. The balance of 207,794 were produced or assembled abroad in Europe, Asia and Latin America.



Some red faces must have appeared among the red noses when the Detroit Safety Council treated eight truck drivers to a drinking party in order to test the effect of liquor on driving ability. Some drivers made a better score after 3 or 4 shots of whiskey chased with beer than they did while sober. Above is Edward Guich, driver, taking one of the tests.

### Lathe Catalog

The new 1938 model South Bend 9-in. workshop lathe together with its attachments, is thoroughly described in Catalog No. 46, recently issued by the South Bend Lathe Works, 520 Niles Ave., South Bend, Ind. Write for your copy.



"He just wants to see if that model really will turn on a dime!"

## Sears and Ward Cut Tire Prices

Drastic and wholly unexpected tire and tube price reductions announced by leading mail-order houses in their mid-winter "Flyer" catalogs just off the press, will not be followed by the tire industry, according to leading manufacturers. On the contrary, independent manufacturers expect their price stabilization program, which has averted serious price warring for more than two years, to withstand the impact of the catalog price slashing without any serious break in the retail price structure throughout the country.

While the mail-order houses have reduced prices on tires and tubes sold via mail-order, they have not altered prices in their several hundred retail stores, and are not expected to do so. Informed sources point out that the volume of tire business done by mail-order has declined to a point where it represents a minor part of the total tire sales of Sears-Roebuck & Co. and Montgomery Ward & Co., the rapid expansion in retail store operations of these two companies having heavily reduced their mail-order tire sales.

## Roos to Willys

Delmar G. Roos, former president of the Society of Automotive Engineers, has been announced as new vice-president and chief engineer of Willys-Overland Motors, Inc., by W. M. Canaday, chairman of the board.

Mr. Roos began his automotive engineering with Locomobile and has been chief engineer of Marmon and Pierce-Arrow.

## A.A.A. Boosts Dirt Track Prize Money

Increased prize money for dirt track competition was assured and supervision of midget racing was promised by the Contest Board of the American Automobile Association at its annual meeting in New York city on Sunday, Jan. 16.

The sport's national governing body ordered a guaranteed purse of "at least" \$1,000 on successful dirt tracks presenting sprint programs. The present minimum is \$750.

The prize increase is in line with the AAA's campaign begun several years ago and which has resulted in increases in some quarters. A committee named at the 1937 meeting of the board reported its finding in a preliminary study. It was this report, a spokesman said, which prompted the decision.

Benefits in the current drive for increased prizes came in 1936. At its meeting that year, the Contest Board hiked the National Championship prize minimum from \$50 per mile to \$75 per mile. The change gave the drivers "at least" \$7,500 for a 100-mile race instead of the \$5,000 previously distributed.

While not yet identified, the first among the midgets to be taken under the AAA wing will be events near the New York city metropolitan area. Plans there were not completed to the point which would allow formal announcement, a spokesman said.

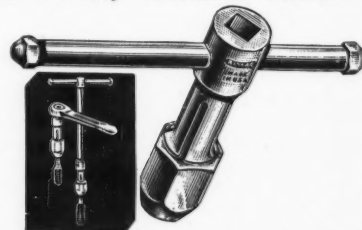
The International Formula of rules, accepted at the 1937 meeting, was approved for all dirt track races. The action will result in a new type of car for the smaller dirt tracks as well as Indianapolis and Roosevelt Raceway.

The first changes in the board membership in a long time came at the recent meeting. Colonel William G. Walls, veteran consultant engineer of Indianapolis, resigned because of retirement from all business. His vacancy was filled by J. Edward Schipper, of Detroit, well known in automotive circles for his work as a publicity director.

E. Von Hambach, also of Detroit, was not reappointed and in his place was named Ralph Ammon, manager of the Wisconsin State Fair, at Milwaukee.

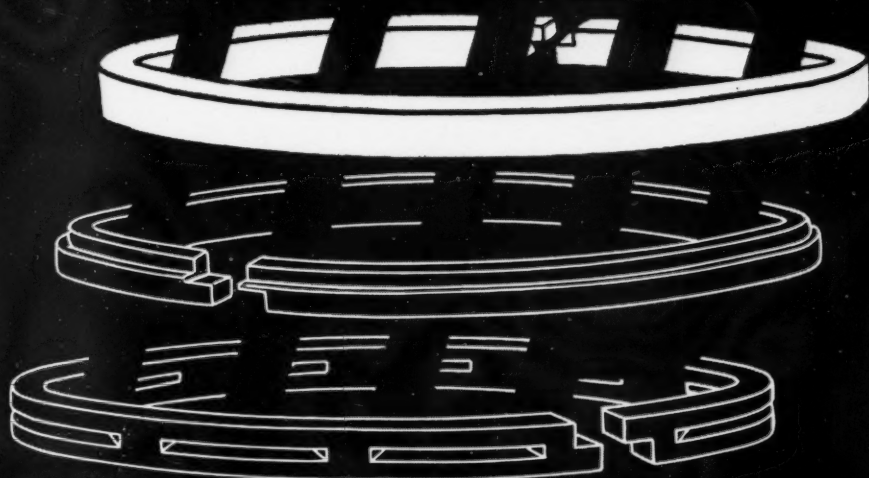
## Universal Tap Wrench

One of the latest products of Rinck-McIlwaine, Inc., 16 Hudson Street, New York City, is their universal tap wrench No. 50. It has a square opening in the head, and a removable T handle. The square opening,  $\frac{3}{8}$  in., will fit any standard wrench set



handles, extensions or ratchets. The chuck is hex-shaped to permit tightening down on the tap head, and is in two steps to take small or large taps. Range is from  $\frac{3}{8}$  in. to  $\frac{1}{2}$  in. Price 90c.





# Lubrication

It has been stated that cylinder bore wear falls generally into three classifications: (1) abrasion; (2) erosion; (3) corrosion. ❖ The first of course is caused by road dust, metal chips, dirt, etc., and has been greatly aided by the oil bath air cleaner.

Erosion is caused by metal-to-metal contact. And it is here that "dag" colloidal graphite can play an important part. The graphoid surface formed on the friction parts withstands the temperatures and pressures existing in the combustion zone. It presents a tough, lubricating film which will resist erosion and at the same time help maintain the oil film. The graphoid surface, being almost a part of the metal, cannot drain off the friction parts. This fact assures its presence during cold starts - a time when most scuffing of piston rings and bores occurs.

Corrosion is caused by the oxidation or chemical reaction of the products of combustion on the piston rings, cylinder walls, and pistons. Here again, the graphoid surface plays an important part. Being chemically inert and covering as it does the friction areas, it serves as a retardant of these corrosive influences.

ACHESON COLLOIDS CORPORATION, PORT HURON, MICHIGAN



## Buick Sales Crack Ten Year Record in 1937

World production of Buick cars in December totaled 18,360, bringing 1937 output to 233,923 units, largest volume in 10 years, according to H. H. Curtice, president. This latter figure compared with 184,255 cars built in 1936, represents an increase of 49,668 units or 26.9 per cent. Including estimated deliveries for the last 10 days of December, domestic sales volume for the year amounts to 203,739 cars against 164,861 in 1936.

Exports in 1937 reached a new high of 22,106 cars. For the preceding year this figure stood at 16,152.

Buick rose to third place in do-

mestic sales with 18,056 units during November, and sales for the first 20 days of December indicate that this position was maintained in the final month. Volume in the fourth quarter approximated that of a year ago. December sales in the domestic market were estimated at 14,000 units, while export shipments totaled 1819.

Buick's 1937 payroll in Flint totaled \$32,000,000. This is an increase of more than \$6,400,000 over last year and places the monthly average at \$2,600,000. The payroll was distributed to 16,399 employees, the average number on the Buick rolls

throughout the year; 2500 more men than were on the rolls in 1936. Since 1934 the total payroll has increased 95 per cent, while average employment increased 43.8 per cent, reflecting not only higher wage scales, but also steadier employment with greater individual income.

## Dyke's New Edition Off Press

The eighteenth edition of the well-known *Dyke's Automobile and Gasoline Engine Encyclopedia* is just off the press with revisions and additions. This complete automotive library in one volume deals with the principles of construction and operation, troubles, tests, adjustments, and repairs of the automobile and its component parts. The eighteenth edition now contains 1,434 pages, 4,617 illustrations, and 16,700 lines of index.

Many new subjects, representing the very latest automobile refinements and developments, have been added to this eighteenth edition. Included is a new and very complete instruction dealing with the principles of construction, operation, and maintenance of automotive Diesel engines, a type of engine now rapidly being developed for use in trucks, tractors, and buses.

*Dyke's Automobile and Gasoline Engine Encyclopedia* is published by The Goodheart-Willcox Co., Inc., 2009 South Michigan Avenue, Chicago, Ill.

## Dispensing Faucet For Steel Drums



A new dispensing faucet for steel drums has been introduced by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill. It can be adapted to a wide range of

liquids including alcohol anti-freeze, gasoline, oil, thinners, etc.

A special merchandiser package consisting of one Sette Faucet counter merchandiser and 6 Imperial Sette Faucets is being offered to dealers for the price of the faucets alone. The display is of steel riveted construction and the faucet screws in just as on a regular steel drum. It is 5 in. wide by 7½ in. high by 6 in. deep, and is attractively finished in orange, black and white.

## Grille Guards Announced by Pick

The Pick Manufacturing Co., West Bend, Wis., has recently announced a complete line of fender and grille guards which attach to the bumpers and which also may be used to protect rear body panels and trunk lids. They are supplied in both the post and arch styles. For complete information and catalog sheets, write the manufacturer.

# Safety LIGHTING

## A TRIUMPH

in Efficiency  
and Dependability

## K-D ELECTRIC FLARES

with K-D Exclusive Features

**E**NGINEERED and built to render maximum performance. Bulldog strength and resistance. 1938 streamline design. Fresnel type lens—same as in U. S. lighthouses—exclusive with K-D. Body drawn in one piece. Moisture, dust and fool proof.

Unsurpassed for quality—  
long life—endurance.

Write for new  
1938 catalog  
and copyright-  
ed chart of  
I. C. C. rulings.



MODEL No. 565  
K-D SHO-TURN  
Direction Turn Signal



MODEL No. 855  
FOG LAMP



MODEL No. 604  
ELECTRIC FLARE



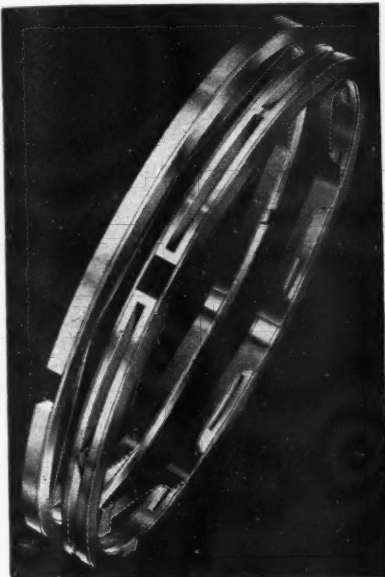
**THE K-D LAMP CO.**  
CINCINNATI, OHIO



## Ramco's New 10-Up Ring

Replacement oil and compression rings that are said to compensate for wear in excess of 0.010 in., have been announced by the Ramsey Accessories Mfg. Co., St. Louis, Mo.

The new Ramco product is a "steel" type piston ring combination known as 10-Up, and consists of both compression and oil rings. The oil ring consists of two steel sections between which is a complete cast iron oil ring of the Ramco Jumbo Slot design, and the Ramco ring expander. The cast iron bearing surface of the assembly is over twice that of the steel seg-



ments. The ring is so constructed that only the cast iron segment receives the pressure of the inner ring expander, the steel segments contacting the cylinder wall with only their own inherent tension, during the wearing-in process. After this period has been completed, the expander begins to exert its pressure upon the steel segments as well, but by that time the steel segments have become perfectly seated without damage to the cylinder walls.

The 10-Up compression ring consists of an upper section of cast iron and a lower segment of steel, and follows the same breaking-in process.

## United Air Cleaners for Hudson

United Air Cleaner division of United Specialties Co. has the contract for supplying the oil bath type air cleaners used on the new Hudson 112. United oil bath air cleaners are also being used on the other Hudson models.

## Defiance Appoints Pontius

Raymond P. Lipe, president of Defiance Spark Plug Corporation, announces the appointment of P. M. Pontius as sales manager of Defiance.

Mr. Pontius comes to the Defiance organization with 29 years' experience in the automotive industry, having spent approximately 25 years in the tire field, the remainder of the time in the auto accessories and replacement parts field.

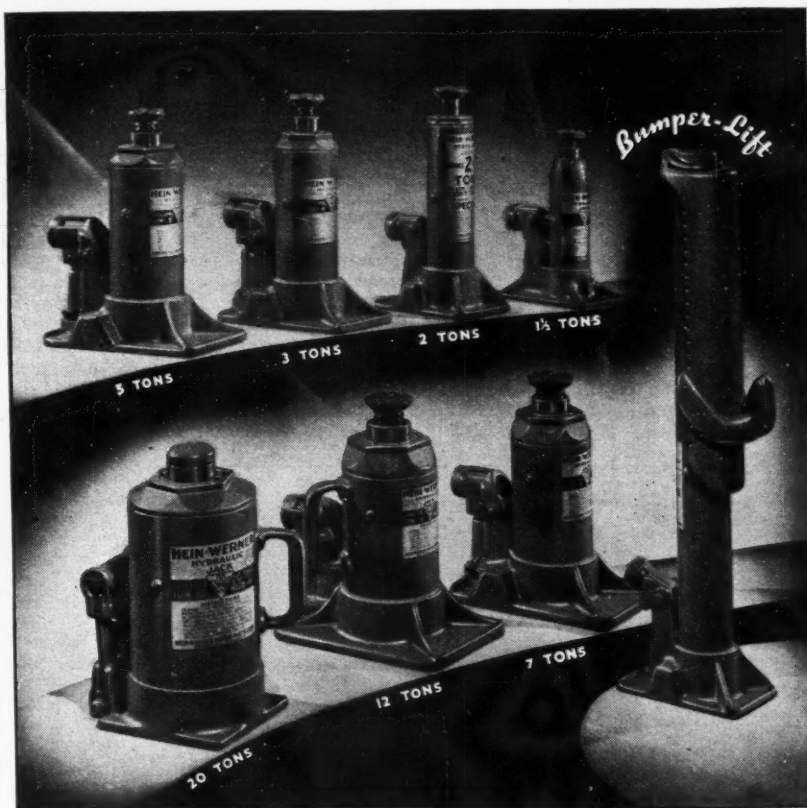
## World Highways Increase 3% in 1937

Within the past eight years more than 3,000,000 miles have been added to the road maps of the world and unless war conditions prevail generally during the next decade, the greatest highway extension and modernization program of all times will be seen, F. C. Horner, Member of the Staff of the Chairman of the Board of General Motors, said in an address before the Women's Traffic Club of Greater New York.

Speaking on the topic of "World Highway Development," Mr. Horner presented a summary of existing highway conditions and current progress

being made in principal European and Asiatic countries and in the Americas. He revealed that as of January 1, 1937, there were 9,900,000 miles of roads in the world's highway inventory. This, he said, represented an increase of 300,000 miles, or about three per cent, over the preceding year, and an increase of more than fifty per cent over the 6,500,000 miles of highway which existed in 1929.

"On the statistical side it is interesting to note that in the eight year period, 1929 to 1936, world highway mileage increased 50.7 per cent, registrations increased 24.2 per cent.



## COMPACT and POWERFUL

Hein-Werner Hydraulic Jacks have many superior features... All models in this complete line are compact, powerful and SAFE—in addition to being built right and priced right.

Before leaving the factory these jacks are tested at 1 1/2 times their rated capacity. None can lower accidentally because the handle must be removed from the pump to open the release valve.

This complete line includes the right jack for any and every car, truck or bus. The "Bullet" 1 1/2 ton capacity jack is only \$2.80... Light Truck Special, 2 ton model, \$3.70... 3 ton

model, \$6.95... 5 ton, \$8.95... 7 ton, \$11.75... 12 ton, \$17.50... 20 ton, \$30.00... And for modern passenger cars, Light Model BUMPER-LIFT, only \$4.10... Heavy Model, \$5.45... All prices are net to dealer, and slightly higher on West Coast.

Hein-Werner also makes a complete line of FLOOR JACKS—2, 3 and 4 ton capacity.

Ask your jobber salesman or write us for details.

HEIN-WERNER MOTOR PARTS CORP.  
Waukesha, Wisconsin

FEW MODELS ENGINEERED TO DO THE WORK OF MANY  
**HEIN-WERNER**  
hydraulic JACKS

## Grille Service

(Continued from page 15)

so that it will act as a door hinged at the bottom—in this manner you will avoid the possibility of scratching the fenders.

When reinstalling the lower half, it will be found easier to get it lined up and the anti-squeak in position if you will install the upper bolt on each side—the ones directly opposite the headlights—first, as this will hold the grille in place and will permit adjusting the anti-squeak and lining up the other bolt holes. The bolts in the bottom holding the splash shield should be put in last.

The two sides of the lower half of the grille are held together at the center by stove bolts. These bolts also hold the center chrome strip of the DeLuxe model, at the point of the "V." The center chrome strip of the Standard model snaps in place, and is removed by prying off with a screw driver.

**CHEVROLET.** This grille is removed in one piece, although it is furnished by the parts department as two halves bolted together at the center. Raise both sides of the hood, and remove the top baffle which is held in place by three screws on each side of the center, one screw in the rear center which holds the light screen, and two machine screws holding the center hood strip to the top of the grille. (The light screen is a piece of sheet metal installed in the center of the grille and extending back toward the core—its purpose is to make it

impossible to look through the grille from one side to the other.) Remove the radiator cap and lift up the rear of the baffle, sliding it up over the top tank, and drawing it out to one side.

The grille is removed by first removing two bolts holding the top of the grille to the sides of the radiator shell. These bolts, one on each side, are reached from the inside of the grille. Next remove three screws on each side of the grille by using a screw driver inserted through the bars of the



**Brake reaction timed by pistols mounted on Studebaker now touring the country to demonstrate safety methods. The pistols shoot paint capsules. A passenger fires the first, the second is fired the moment the driver's foot hits the brake pedal. Repeated trials have shown that the fastest reaction cannot halt the car until it has moved four full car-lengths—even with the auto traveling at the average speed of 30 m.p.h.**

grille, from the front. Then remove two screws that are located close together in the center of the grille at the bottom. Hold the grille with one hand at the top and one at the bottom, and pull the bottom out first.

When reinstalling the grille, be sure to put in the two bolts which hold the top of the grille to the sides of the radiator shell first. The natural inclination is to install the top baffle first, but if you do, you will have to remove it again to install these two bolts as they are reached from the inside. A screw-holding type of screw driver will be found to be most convenient when installing the grille side screws—otherwise they may drop out of place and fall down into the splash shield, which means that you either have to remove the grille to get them, or spend a lot of time trying to fish them out.

**PLYMOUTH.** The first step in removing the grille from the 1938 model Plymouth is to remove the crank hole cover by prying it off with a screw driver. This will uncover a bolt holding the radiator shell center bar to the shell frame. Remove this bolt, and also the two bolts at the top under the ornament. The center strip will then lean forward at the top and can be picked out of the shell at the bottom, leaving the grille completely exposed. Reaching down through the top opening, between the radiator core and the grille, remove the four bolts along the top of the grille holding it to the radiator shell. Then, along the sides of the grille from the inside, remove six screws holding the sides of

# \$5000.00

## FOR THE BEST EXPLANATIONS

# "WHY GREY-ROCK IS THE

### PRIZES

**FIRST PRIZE . . . . . \$1,000.00 CASH**  
**SECOND PRIZE . . . . . 500.00 CASH**  
**Third and Fourth Prizes . . . . . \$100.00 Cash Each**  
**Fifth, Sixth and Seventh Prizes . . . . . 50.00 Cash Each**  
**Eighth, Ninth, Tenth and Eleventh Prizes . . . . . 25.00 Cash Each**

#### Next 75 Prizes

**New Alden-Cowdrey Brakeometers (Value \$12.50 Each)**

**Next 50 Prizes—\$5.00 Cash Each**

**... and an Acknowledgment Prize to All Other Entries . . .**

**YOU CAN'T LOSE—NOTHING TO BUY—NO BOX TOPS**

**JUST WRITE  
50 WORDS**



### READ THESE EASY RULES

1. Contest open in United States and Canada only to the Proprietors, Foremen and Mechanics in garages, repair shops, service stations, brake shops and car dealer establishments, and also the Foremen and Mechanics in fleet operators' shops.
2. In fifty words or less tell "why Grey-Rock is the Fastest Growing Line."
3. Write clearly on any white paper or ask your Grey-Rock jobber for official entry blank with suggestions for winning. Judges will not be influenced by grammar, spelling, penmanship or fancy entries. It's what you say that counts.
4. Be sure to give your own name, your company's name and the address of the place you work. Also give your Grey-Rock jobber's name and the name of his salesman who calls on you.
5. Contest closes midnight, June 15, 1938.
6. Duplicate prizes will be awarded in case of a tie. Judges' decision is final. All entries become Grey-Rock property.

# Grey-Rock



the grille to the shell. The grille will then be entirely loose from the shell. Push it back toward the core, tip it slightly to one side and pull the top out of the shell, lifting the grille so that the bottom will clear.

Installation is exactly the reverse of removal, that is, the grille is tipped to one side and the bottom inserted in the shell first, then the top is pushed in. Straighten it up and bring it forward to the shell, installing the side screws first. The radiator shell center bar is installed last.

**DODGE.** Perhaps the easiest of all the 1938 model grilles to remove or install, the Dodge grille is distinctly two halves and is removed in that manner. It is held to the shell by stove bolts that are reached by inserting a screw driver through the grille from the front. Space between the core and the grille permits reaching down inside to hold the nuts on the bolts. There are three bolts on the side and three in the center. Be careful when taking out the last bolt, and hold the grille to prevent it from dropping down on the splash shield. It is a die casting, and rather heavy.

If it is necessary to remove the center strip of the grille, between the two halves, which is properly called the radiator grille center bar, the first step is to remove the crank hole cover and remove the two bolts holding the center bar to the radiator grille support frame. Then remove the six bolts holding the hood center panel and raise the panel so that it is possible to remove the bolts holding the grille center bar to the support frame

at the top. The grille center bar can then be lifted out of the frame at the bottom.

**PONTIAC.** This appears to be the most difficult of the 1938 grilles to remove. The first step is to remove the hood side panels, which are held in place by wing nuts reached from the inside—two at the front and one at the rear. When the panels are removed, two bolts will be exposed on each side of the grille. Remove these two bolts which hold the grille to the radiator shell. Then remove two nuts



**Southern Hospitality** reached a new high when the state of North Carolina played host to 100 visitors over a period of twelve days in which 53 communities vied in entertaining. Here are two of the "guests" being treated to a ride in a 1903 car at New Bern.

from the bolts directly in back of the name "Pontiac." The heads of these bolts are held in place by part of the bracket being bent over them—it is not necessary to remove the bolts. The next step is to remove the bolts attaching the "V" brace which holds the grille to the radiator shell, at the top tank of the radiator. At the very bottom of the radiator shell there is a splash shield held in place by three bolts on either side of the center. Remove these bolts, and remove the splash shield.

The radiator grille proper is that part of the grille above the numeral "6" or "8"; the lower part of what looks like the grille is really the radiator shell. This is clearly shown in the illustration. It is necessary to separate the grille from the shell at the center by removing two bolts at the bottom of the grille center bar. Reaching in between the grille and the core, remove two metal screws on each side holding the grille to the radiator shell. Next loosen the hood center panel where it is attached to the top of the radiator shell, and raise it up about one inch, so that the two bolts in the top of the center panel will clear the grille. Pull the grille forward and lift it slightly at the same time, so that it will come out as shown in the illustration.

If the lower part of the radiator shell is damaged directly underneath the grille, it will be necessary to remove both front fenders and the hood to remove the radiator shell as a complete unit.

(Continued on page 69)

# ON CASH and prizes

## IN 50 WORDS OR LESS . . . OF

### THE FASTEST-GROWING LINE"



Being the fastest-growing line for the past several years is no accident. Motorists must find the product satisfactory, shop owners must see the advantages, mechanics must find real help in them. Grey-Rock has reasons galore. Your biggest job will be to state them in fifty words.

Remember that Grey-Rock is not just a group of brake linings. It's a whole brake-balancing system. It is a condensed series of boxed sets made especially for individual cars. It is an up-to-the-minute collection of the newest information and materials in the brake industry put there by a corpora-

tion with products on nine out of ten cars and much of the new-car equipment. It is full and detailed instructions, helping mechanics to service every make of brakes. It is an advertising plan that brings business to Grey-Rock dealers. It is freedom from cheap competition, relief from heavy inventories, a valuable and profitable franchise. It is the path to quick, quiet, smooth stops with longer wear. It is the line which changes "brake service" into "balancing brakes."

Someone will win \$1000. It may be you. Many others will win cash or valuable prizes. Send your answer to Grey-Rock, Dept. M.A.F., Manheim, Pa.

UNITED STATES ASBESTOS DIVISION of Raybestos-Manhattan, Inc., MANHEIM, PA.

BRAKE LININGS • CLUTCH FACINGS • FAN BELTS • HOSE • PACKINGS • RELINING EQUIPMENT

# BALANCED BRAKES

## Wood Takes Over Master Engineering & Service Co.

John A. Wood, Associates Inc., of 40 Exchange Place, NYC, has absorbed the Master Engineering & Manufacturing Co., 42 Clay St., Newark, N. J. Mr. Raymond C. Fow, former proprietor, has been retained as head of the factory which has installed new tools and equipment.

Among the products being manufactured by the John A. Wood, Associates Inc., is a Master Transmission Hoist (formerly sold under the name of "Anchor Hoist") requiring only one mechanic to easily remove and replace the heaviest transmissions. Among its features are its safety,

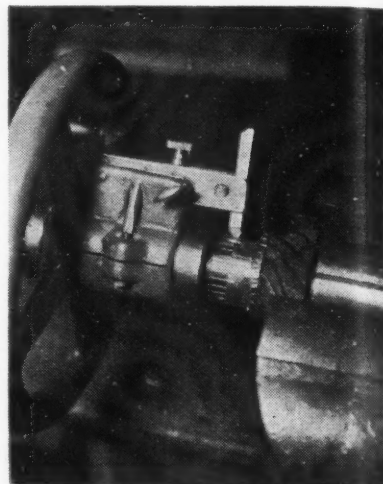
speed, accuracy and economy. Because only one man is needed to handle the whole job, it allows the "extra" men to do other work, thus cutting down on the cost of labor. The hoist is made to safely lift 1000 pounds, although in authentic laboratory tests it has lifted 2250 pounds and will retail for \$17.00. A heavy-duty hoist for truck and bus transmissions will retail for around \$24.00.

Another product now being completed is the Master Tire-Spreader for use in service stations and other tire repair shops. Still another is the Master Axle-Puller, retailing at \$1.75.

## Reconditions Armature

Smart Tools, Inc., 144 Pocasset St., Fall River, Mass., has introduced a hand-operated machine for turning commutators and undercutting mica of generator armatures.

The machine is mounted on the true



running surface of the armature shaft to guarantee accuracy of alignment. The large wheel revolves with the cutting tool, to turn down the commutator. Another cutter is attached to the instrument for undercutting the mica. Garage net price, \$23.50.

## "WE WANT YOU TO TAKE THE STATEMENTS WHICH FOLLOW . . . . . AT FACE VALUE"

You can increase your "take" \$100 a month with a Master AIR-STRAINER CLEANER.

You can't do it by tossing this ad aside . . . you can't do it by putting it off until next month . . . but you can by grabbing the phone and saying to your jobber—"Send me a Master, and if you haven't got one—get it!"

Dealers and Repairmen say "Master Pressure Cleaning of Air Strainers is the most efficient, time-saving, and profitable service we have offered in years"—and that is why—we say—"Blowing Cars' Noses, the Master Way—is sweeping the country!"

But you can't sell this new, long profit quick service,—unless you ACT!

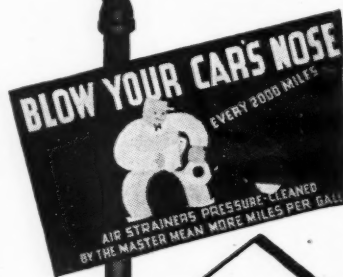
Pedestal Type \$19.75 . . . Bench Type \$12.75.



### MASTER BENCH TYPE

Recommended for transportation units where the merchandising of this imperative and recommended service, to motorists, is not a sales factor.

A "natural" for car dealers and fleet operators! Insist upon, demand and get, a Master—from your jobber. Start making that \$100 a month today!



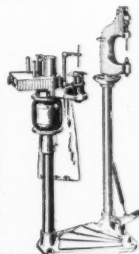
HAWLEY MANUFACTURING CO., INC.  
CHESTER, PA.

## General Motors to Produce Lightweight Diesel

General Motors made public its plans for mass production and sale of small, light-weight, two-cycle Diesel engines. The new line will be manufactured in the present factory of the Cleveland Diesel Engine division of the corporation (formerly the Winton Engine Mfg. Corp.), Cleveland, and two new factories. The latter include the Detroit Diesel Engine division of the corporation at Detroit, now in operation, and the new engine factory of the Electro-Motive Corp.'s Diesel locomotive plant at LaGrange, Ill., which will be in operation within a few months.

## Ace Brake Reliner

Among the new pieces of equipment exhibited at the A. E. I. Show in Chicago was the Model A Ace Brake Reliner introduced by the Chicago Rivet & Machine Co., 1830 S. 54th Ave., Cicero, P. O., Chicago, Ill. The new unit is suitable for the heavy service required for bus, truck and passenger brake shoes. Among the improvements included in Model A is a circular rivet tray. Drilling and counter sinking unit is located between the grinder and the rivet head, resulting in greater operator convenience. Complete descriptive literature may be obtained by writing the manufacturer. Price \$82.50.





YOU CAN DEPEND ON

# CHAMPION

TO BACK YOU WITH MORE ADVERTISING



4 National Weeklies  
3 National Monthlies  
10 Farm Publications  
5 Boating Publications  
4 Fleet and Bus Publications

The primary force that makes any product acceptable to the consumer is reputation.

The greater and more continuous the advertising back of a product, the greater the recognition of its reputation.

Champion's reputation is squarely based on quality and performance.

Hence, *profits and turnover for the Champion dealer* are continuous.

In 1938 dealers handling Champion Spark Plugs will again have the advantage of the strongest advertising support in volume, size and dominance of all markets ever put back of a spark plug.

Study these national magazines, farm publications, fleet papers, motor boat books and newspapers which will carry Champion schedules throughout the year. You'll see that Champion gives you advertising support that is unequalled.



CHECK AND CLEAN SPARK PLUGS WHEN YOU CHANGE OIL

## Perfect Circle

(Continued from page 22)

considered to be one of the best automobile motors built at the time.

One of the handicaps facing the pioneer motor and motor car builders was the almost complete absence of a parts industry, so that it was necessary for each producer to make everything he used. In building a good motor, the Teetor-Hartley organization had to develop and fabricate its own piston rings as well. Thus when in the spring of 1918, the motor business was sold to the Ansted interests of Connersville, the Hagerstown

group retained the piston ring department—named it the Indiana Piston Ring Co.—and continued the manufacture of rings for some of the largest motor car producers in the country.

From the very beginnings of its piston ring department, the company had developed a method of producing individually-cast rings, forerunner of the modern practice, said to be almost universally used today. Many other early piston ring developments and refinements are attributed to the Perfect Circle Company, so renamed Oct. 15, 1926. Among the most important of these are the oil-regulating ring with the patented groove-and-slot

principle, the square joint type "70" compression ring and X-90 oil and compression rings.

It is an interesting commentary that the second generation of the Teetor family of Hagerstown widened the field of the piston ring business not only in point of volume in standard equipment and in the replacement field, but from the viewpoint of fundamental research in product design, materials and engine development.

To meet the immediate needs of the replacement and service trade both here and in Canada the company operates four different establishments—the home plant at Hagerstown, another at Tipton, Ind., a Canadian plant in Toronto—all served by its own foundry in New Castle, Ind.

Substantial stocks of rings are maintained for equipment customers and also twenty million rings for the replacement trade. These stocks are carried at Hagerstown and in the establishments of jobbers all over the country.

Ever since the Teetor industrial dynasty was founded in 1895 by the Teetor brothers, it has remained the first and only industrial enterprise in Hagerstown and its environs. Hagerstown proper has a population of only some 1400 people, and in consequence the plant draws upon the population of the surrounding area within a radius of many miles. Thus its workers are recruited from the native, or country folk, who leave farm or homestead each day to drive to the plant.

There is a feeling of security and contentment in the community quite foreign to the complex undercurrent of social activities in larger industrial centers. The people hereabouts are a loyal group actively interested in the well-being of a home industry and anxious to promote and continue the friendly relationship between the management and workers. Fortunately for the business as well as the loyal community it serves, the management has been far-seeing in its efforts to stabilize the flow of business and employment. The usual peaks and valleys of production have been smoothed out by an ever-expanding replacement trade fostered through jobbers and dealers.

Thus the loyal workers of this unique community are spared, to a great extent, the impacts of the ordinary course of employment in the larger industrial centers and the yearly income per person is probably well above the average in mechanical trades.

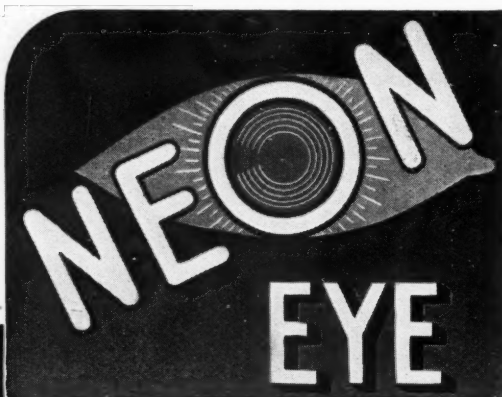
Broadly speaking, the P-C organization performs an invaluable service to the industry by virtue of progressiveness in thinking and in carrying on an unabated program of engineering research. So far as original equipment is concerned, probably two elements of recent origin have been almost sensational in their influence upon engine design. The first was the commercialization of the now well-known "200" compression ring adopted by International Harvester, Dodge, American Bantam and Buick. In the case of the latter it offered the solution to the top ring problem on the new Turbulator piston which is a feature of the Buick Dyna-flash engine for '38.

(Continued on page 66)

# ONLY the New BEAR DYNAMIC WHEEL BALANCER has the



FOR THE FIRST TIME  
100% BALANCE  
IS POSSIBLE  
AT ALL SPEEDS!



No more trouble getting the shimmy out at 50-60-70 m.p.h.! That means LESS TIME per Wheel Balancing Job — NO COMEBACKS—NO IRRITATED CUSTOMERS—and MORE PROFIT for you!

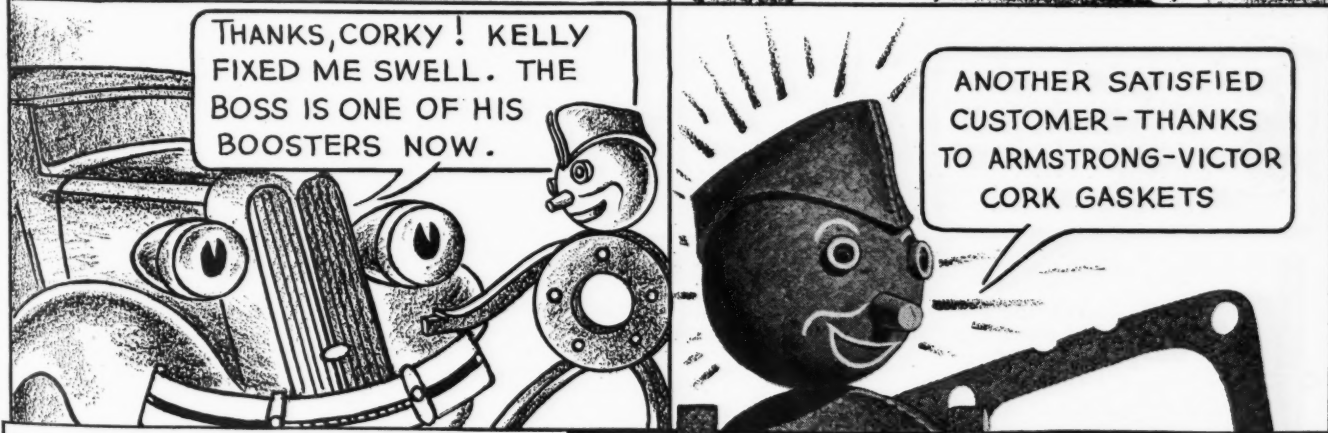
The NEON EYE does something never before possible. Makes possible correct Dynamic Testing and Balancing of Wheels at all speeds. The NEON EYE Spots every unbalanced section of the wheel! No guess work. Investigate this BIG PROFIT Bear Invention. See why it will also increase wheel alignment jobs! Be the first to have it in your locality. Address Bear Mfg. Co., Rock Island, Illinois.

# BEAR

The Greatest Name in  
Precision Made  
SAFETY TEST and  
CORRECTION EQUIPMENT



# REPAIR SHOP ADVENTURES OF **CORKY**



**Armstrong-VICTOR**



**CORK GASKETS  
and  
HEADLAMP CORK**

Give your customers *guaranteed* gasket jobs every time. Give them Armstrong-Victor Cork Gaskets.

These gaskets are made of live, high-grade cork. They are strong and durable. They are easy to handle. They always fit—because the bolt holes always line up.

Right now is the time to start giving your customers better gasket jobs. Order handy-package sets of Armstrong-Victor Cork Gaskets for all popular cars from your Victor jobber today. Or write to Victor Manufacturing & Gasket Company, P. O. Box 1333, Chicago, Ill.

## N.S.P.A. President



V. C. Hossellman

V. C. Hossellman, manager of Siferd-Hossellman Company, Lima, Ohio, was elected President of the National Standard Parts Association for 1938, at the Association's fourteenth annual convention recently held in Chicago. L. G. Matthews,

Sealed Power Corporation, Muskegon, Michigan, was elected senior vice-president, and the choice for junior vice-president was V. C. Anderson, president, Motor & Axle Parts Service, Inc., Chicago.

Four new manufacturers were elected to the Board to replace those whose terms had expired. They are: L. E. Fogel, president, Automotive Specialty Corp., Brooklyn, New York; A. G. Drefs, vice-president of McQuay-Norris Manufacturing Co., St. Louis, Mo.; O. R. McDonald, sales manager, Manley Manufacturing Division of American Chain & Cable Co., Inc., York, Pa.; and J. E. Adams, sales manager, Toledo Steel Products Company, Toledo, Ohio.

## New Menasco

### Aircraft Engine

The Menasco Mfg. Co., Los Angeles, Cal., has entered the low horsepower engine field with a 50-hp. four-cylinder, horizontally opposed L-head, air cooled, aircraft engine.

Displacement is 144.4 cu. in. with a bore and stroke of 3 1/2 in. by 3 3/4 in. The engine develops 50 hp. at sea level at 2550 r.p.m. and the dry weight is 156 lb. or approximately 3.2 lb. per hp.

Features of the Menasco M-50 pointed out by the manufacturer include increased cooling as a result of more total fin area, enclosed valve mechanism, and a square section manifold.

A wet sump with a geared type oil pump is utilized with the crankcase finned for increased oil cooling. Oil capacity is four quarts. A Stromberg up-draft carburetor with altitude control and a single Bendix Scintilla magneto are other features of the new engine.

The crankshaft is of the one-piece, three throw type with two main bearings. Cylinder blocks are of nickel cast iron with aluminum alloy cylinder heads bolted on the cylinder blocks. Over-all width is 27 5/16 in. Compression ratio is 5.5 to 1.

### Per-Fect-O Boring Bar

A new heavy-duty boring bar manufactured by Van Norman Machine Tool Co., Springfield, Mass., Catalog No. 777, has been placed on the market.

This bar is said to be the first machine of its type that will take large cuts at high speed, yet is light enough for one man to handle. It will bore or sleeve any block from 2.6 in. to



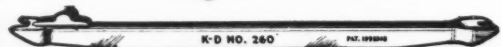
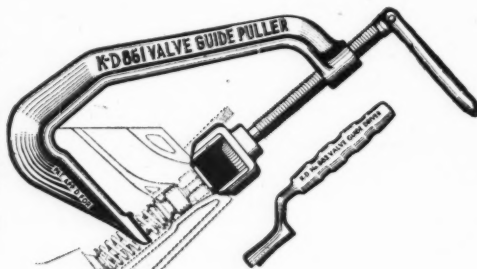
for FORD 60 HP, tool

Here's a brand NEW set of K-D Tools, necessary to service valves on the 60 HP Ford. Little brothers of the tried-and-proven K-D Tools for 85 HP Ford and Lincoln-Zephyr. They're time savers, every one!

#### No. 860 VALVE GUIDE PULLER SET (DRIVER AND PULLER)

for removing valve assemblies, no matter how tightly they're frozen! Pulls straight up with utmost speed and absolute safety. Drop-forged and hardened steel.

List Price ..... set \$9.50  
Similar Set for Ford 85 and Lincoln-Zephyr No. 920 ..... list \$10.00



#### No. 260 BAR TYPE VALVE LIFTER



used in conjunction with the 860 Set and also necessary when putting valve assemblies back in the motor block. Rigid channel construction but not intended for freeing FROZEN valve guides.

List Price ..... each \$1.00  
Similar Lifter for all models Ford 85 No. 240 ..... list \$2.15

#### No. 865 VACUUM VALVE GRINDER



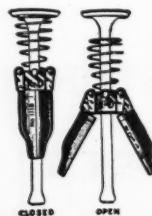
for grinding valves into seats. Vacuum cup grips valve head and metal retaining ring keeps it from slipping off. A practical time saver.

List Price ..... each \$ .60  
Similar tool for Ford 85 and Lincoln-Zephyr No. 503 ..... list \$ .60

#### No. 1160 VALVE GRINDING BUSHING

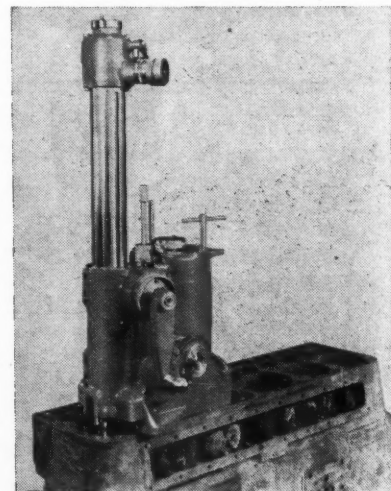
a one-piece tool used in place of the guides when grinding valves. Accurately machined for exact fit. Jumper spring attached.

List Price ..... each \$1.00  
Similar Bushing for Ford 85 and Lincoln-Zephyr No. 1118 ..... list \$1.00



ASK YOUR JOBBER FOR DEALERS' NET PRICES

**K-D MANUFACTURING CO.**  
Lancaster, Pa.



5 11/32 in., and has ample power throughout the entire range provided by a 1/2-hp. capacitor motor. It has two feeds and two speeds; takes .050-in. cut at any diameter within its capacity. The new bar incorporates the standard Van Norman Per-Fect-O features including the four patented catspaws that guide the cutter all the way down.

#### Carter Appoints Durance and Durler

Carter Carburetor Corp. announces the appointment of Mr. Floyd H. Durance and Mr. Russell W. Durler to their Engineering staff.



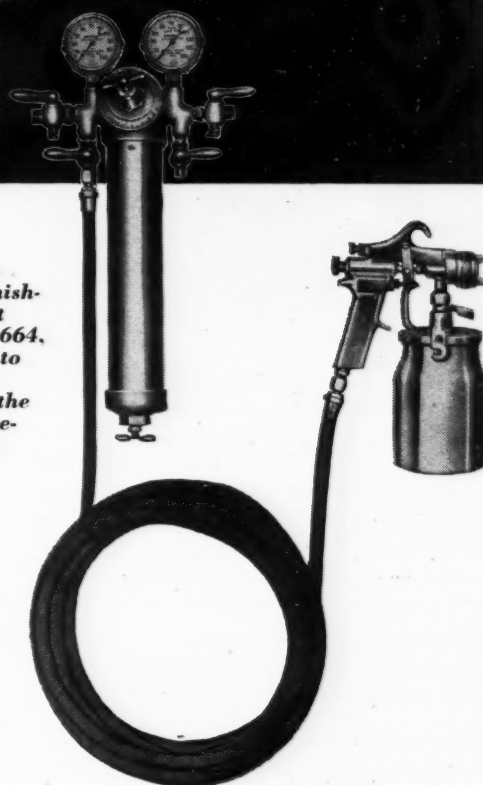


● Put factory quality into your refinishing operations. Use the same equipment car manufacturers use to finish new cars—DeVilbiss Spray Painting Equipment.

● Leading automobile builders produce that fine new car finish with DeVilbiss Equipment. They use it because its modern and efficient design facilitates high quality of workmanship. Its operating economy reduces painting costs. Its simplified operation gives production-line speed.

● Put these profitable features into your refinishing operations. Use the DeVilbiss Spray-Painting Equipment that is producing these advantages for car manufacturers. See your local DeVilbiss distributor for complete information.

*DeVilbiss  
Spray-Finish-  
ing Outfit  
Type AP-664,  
designed to  
meet the  
needs of the  
average re-  
finishing  
shop.*



**THE DEVILBISS COMPANY • TOLEDO • OHIO**

*Distributors or direct sales and service representatives available everywhere*

# DeVilbiss

AIR COMPRESSORS  
SPRAY-FINISHING  
EQUIPMENT • OIL  
GUNS • HOSE AND  
HOSE CONNECTIONS

## Signs

(Continued from page 12)

advertising of the manufacturers by use of the promotional material which they send him.

Plastering one thousand and one of the "silent salesmen" around the walls does not necessarily help sales to a great extent. Too much display material in sight may fail to impress the customer with any individual piece, while just a few signs or banners placed with a little care will be sure to attract at least momentary attention.

Before putting up any sign it's a good idea to stop for a moment and

consider whether or not the place chosen for it is a spot that will command the attention of the customer. No sign will be much help if the customer must lie flat on his back on the floor or climb to the top of a parts bin to see it.

The attention value and potential sales help of any sign or banner is greatly increased if the sign or banner can be placed on or near a display of the product whose virtues it describes. By the same token, the value of a sign advertising, for instance, XYZ Motor Oil will be thoroughly squelched if it is hung over a neatly arranged stack of ABC Motor Oil cans.

The value of any sign, or display, of a fairly permanent nature is lost

when the sign is kept too long in the same spot. If customers were all new customers the sign might remain in the same position indefinitely without losing its attention drawing power, but the customer who comes in regularly will grow accustomed to seeing a certain sign in a certain spot and its sales message will be lost on him. In his eyes it becomes a fixture such as a chair or table and he will look at it without really seeing it. Changing the position of signs occasionally results in their sales message being brought freshly to the attention of the customer at each visit.

The position of many a sign that has hung on the wall for a long time should be changed from the wall to the wastebasket. Especially is this true if the sign depends upon timeliness for its value. A display card remaining until May or June is useless if it is designed to implant in the mind of a customer the thought that a Super-Super Car Heater makes an excellent Christmas gift. Similarly an August customer is not likely to be sold on having his car waxed through seeing a sign announcing that a wax job will protect his car's finish from winter sleet and snow.

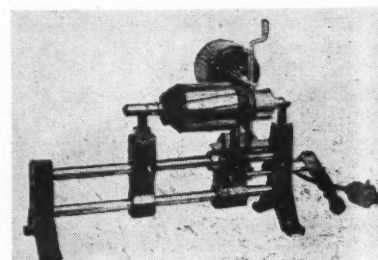
Even a sign that has no time feature may be due for a trip to the wastebasket. Cardboard signs become torn, cloth banners become tattered and frayed and both may become exceedingly grimy. Metal signs may have most of the paint chipped off or the letters obliterated by rust. Signs in such a condition should be removed at once. Their very appearance tends to turn a customer against the product which they concern rather than attract the sort of interest which may result in a sale.

If a metal sign of a more or less permanent nature is hung on the wall or, especially, outside its appearance may be kept at its best for a long period of time by giving it a good protective wax coating. Outside signs may also be made more compelling with a few pieces of wood and a little paint. Some sort of neatly painted frame will make a mighty attractive miniature billboard to stand at the shop entrance.

Give these silent salesmen a little thought and a little care and they WILL help to sell. Neglect them and they're likely to hinder sales effort.

## Trucut Mica Undercutter

Frank N. Wood Co., Wauwatosa, Wis., has announced a new model Trucut Mica Undercutter. The new model embodies many new time and



money saving features. It is claimed that mica undercutting can be done in a fraction of the time formerly required, and the new model occupies a bench space of but 14 in. square.



Now you can replace any tire valve on any size of tube and make all sizes and shapes of "Hot Patch" repairs with one vulcanizer! The new Schrader Vulcanizer handles all tubes, from the smallest cycle to the largest truck size. It's rugged, too—built to last for years has no gadgets—no delicate parts to replace. It is not dependent upon electric current—has no wiring—no installation problems.

When you start a cure it's completed surely and quickly. The clamp of the vulcanizer distributes pressure evenly over the entire area of the work, to produce a thorough, feather-edge cure in approved factory style.

Heat is applied the Shaler "Hot Patch" way. Each job has a fresh heat unit, assuring the exact temperature for a perfect job every time!

Bring your tube repair department up-to-date with equipment that will handle more work for you.

A. SCHRADER'S SON  
Division of Scovill Manufacturing Company, Incorporated  
BROOKLYN, N. Y.

## 2 LOW-PRICED SETS



No. 9900	No. 8900
1—8900-A Vulcanizer	1—8900-A Vulcanizer
2—No. 15 RH* Valves	2—No. 15 RH* Valves
3—No. 25 RH* Valves	3—No. 25 RH* Valves
3—No. 35 RH* Valves	3—No. 35 RH* Valves
1—Roughener \$4.25	2—No. 50 RH* Valves
	1—Roughener \$5.00

\*RH means with heat units

Order Shaler "Hot Patches" from your regular source of supply

## 2 WAYS TO BUY

1. In the specially priced No. 9900, or No. 8900 Vulcanizer Sets.
2. Order the No. 8900-A Vulcanizer only (price \$3.25), plus separate quantities of valves with heat units to meet your particular requirements.

SOLD BY LEADING AUTOMOTIVE SUPPLIERS EVERYWHERE

**Schrader**  
TUBE VULCANIZER

ALL PRICES SHOWN ARE DEALER PRICES IN U. S. A.



# U. S. ELECTRIC TOOLS

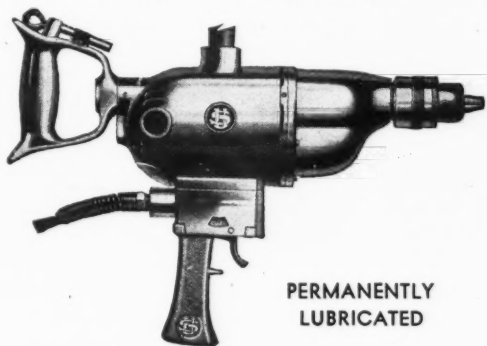
## Are Built to Serve Your Shop

The U. S. Electrical Tool Company has been serving thousands of mechanics in the better motor repair establishments everywhere with the best in mechanical equipment

for forty years. They continue this service with their ten new tools, designed to insure better work in less time at no additional cost.



### U. S. 5/8" Heavy Duty Drills

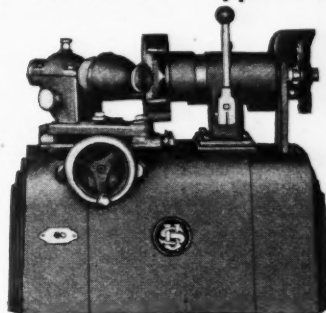


PERMANENTLY  
LUBRICATED

Motor universal, operates on AC or DC current. Ball bearings on armature and chuck spindle. Gears are extra heavy, made of chrome-nickel alloy steel, hardened, run in grease-tight case. Three-jaw screw-back chuck.

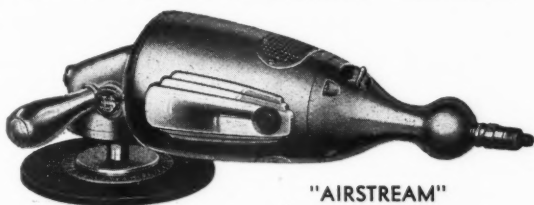


### U. S. Refacer—Type V-R 6



New design—no vibration. One motor drives grinding spindle through V-belt. Chucking spindle driven through flexible shaft to a worm gear drive. Six-point contact chuck. Motors are not universal. DC or AC current, 25 to 60 cycle, single phase.

### U. S. Portable Electric Sanders



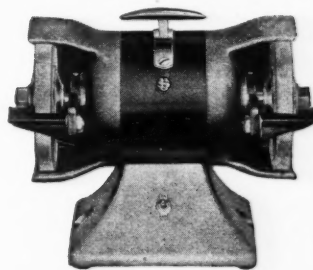
"AIRSTREAM"

New design—air-conditioned and permanently lubricated.

Four new models: 7" Light Duty  
7" Standard  
7" Heavy Duty  
9" Standard

Universal motor, AC or DC current. Equipment furnished: 25 feet flexible rubber covered cable with attachment plug, one disc pad, one each No. 16, 36 and 50 grit abrasive discs.

### New—U. S. "SKIPPER" 6" Bench Grinder



Trouble-free operation—no servicing expense. Motors are entirely enclosed. Ball bearings are sealed in special dust-proof housings. Takes very little current at start and when running. 110-volt, 60-cycle, one phase motor.

Send today for our free catalog. It describes the six other new U. S. Tools and the balance of the U. S. line of automotive shop equipment.

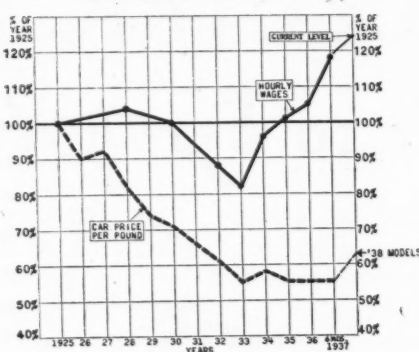
**THE UNITED STATES ELECTRICAL TOOL CO.**  
CINCINNATI OHIO, U.S.A.

## Sales Agents Appointed by Laminated Shim

Laminated Shim Co., Inc., of Long Island City, N. Y., have appointed Industrial Sales and Engineering Company, of Houston, Texas, to act as exclusive agent in the Southwest for the sale of Laminum and other types of shims.

J. H. Draper and W. R. Davis, partners of the sales firm, are both well known throughout the oil country. The head office is in Houston, 501 Citizens State Bank Building. A branch office is maintained at Dallas, Texas.

FROM 1925 TO 1937 AUTOMOTIVE HOURLY WAGES WENT UP 18%  
AUTOMOTIVE PRICES CAME DOWN 45%



## Glycerine Simplifies Spray Painting

Spray painting can be made a simpler, easier task if the areas that are to remain free of the paints are first coated with glycerine. This method obviates the need for cumbersome shields and baffles and permits finer differentiation and sharper lines. Oil-containing paints will not combine with glycerine, and the new quick drying lacquers will not penetrate the glycerine film since their vehicles are not, as a rule, soluble in glycerine. After the spray coating has dried, the glycerine film carrying the unnecessary paint is easily removed with water.

The glycerine will not affect paint already on the surface. Rather, it will lend sheen and gloss. Unpainted metal surfaces will not be affected because glycerine is neutral and will not react with them nor injure their finish.

This method of spray painting is finding wide usage in the finishing of automobile bodies and fine furniture.



**Did you ring, Ma'am?** A British shop owner devised this method of letting customers advise him when they desired service at his outside pumps.

## Sealed Power Adopts New Finish

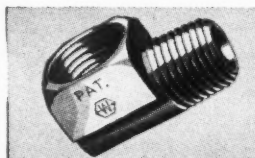
A new finish for the wearing surfaces of piston rings, known as Grano-seal, has been adopted by the Sealed Power Corp., Muskegon, Mich. The process forms a layer of ferrosilicic phosphate on the surface of the rings, which is said to be non-scuffing, to absorb oil, and to be resistant to wear. No high temperatures, which might affect the grain structure of the iron of the ring, are employed in the process, and the performance of the rings, therefore, is not adversely affected in any way.

The objects of the new finishing method are to prevent scuffing, to expedite the running-in process, and to protect the ring under conditions of scanty lubrication. The coating formed by the process also is claimed to give protection against corrosion when the engine is cold and corrosive compounds are formed from the products of combustion.

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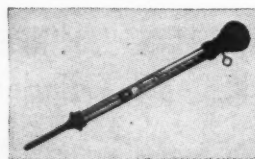
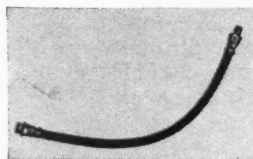
● The fact that Weatherhead Standard equipment parts are used somewhere on every car, says much more than we can about the quality of these parts. For replacements that are like the original, get satisfaction with Weatherhead.

**FITTINGS** A complete line of all standard and S.A.E. types, including patented Weatherhead inverted fittings of better construction, lower price and less weight.



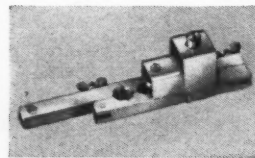
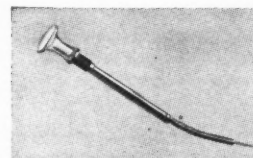
**FUEL LINES** Leak proof and gas proof. The only answer to broken or crystallized metallic fuel and oil lines.

**BRAKE HOSE AND FITTINGS** A complete line of brake pressure hose and hydraulic brake service parts for all makes of cars.



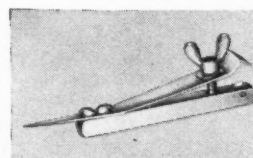
**HYDROMETERS** A complete line that includes hydrometers, thermometers, freezometers, battery fillers and mixer testers.

**DASH CONTROLS** Modern design, striking colors and beautifully finished.



**FLARING SETS** An improved tool that accurately flares brass or copper tubing.

**TUBE CUTTERS** The cutting wheel is extra hard steel. Takes all sizes of tubing for which it is designed. Two sizes.



Ask your jobber for Weatherhead or write for the Weatherhead Automotive Parts Catalog

**THE WEATHERHEAD COMPANY**  
East 131st Street, Cleveland, Ohio



## Control Over Income

(Continued from page 13)

the most important of these are the "Order Sheet," which is made out on each job, and the "daily journal."

The order sheet is a card 4 x 8 inches in size, and has on one side the name of the garage, name of customer, address, make of car, phone number and speedometer reading. On the other side is a wide column headed, "Parts Used on Job," and two other smaller columns, under the heading, "Time on Job." One of these columns has the mechanic's name or initials, and the other gives the time spent on the job as punched by the time clock in the office.

When the mechanic is working on a job, he makes out one of these cards, and goes to the stock room for his parts. The parts he uses are listed on the card, and the time he starts the job and time he finishes it are checked by the clock.

The job being finished, the card is turned into the office, and the bookkeeper makes out a bill, on which are itemized the data of the card. The work or order sheets are then filed by number and kept in the office. The following morning, however, every order sheet is checked with every billing to find out whether any mistakes have been made on either one of them.

Then the information from the work sheets is entered in the daily journal under the various headings of parts and labor. This daily journal is the main source of information and control over what is paid in and what is paid out.

The journal has in it sheets with headings for different columns, showing sales, purchases and expenses. Thus there are columns for labor costs, purchases, sales, payments, bank account, cash on hand, and the like. Every time some money is paid out, or some is taken in, the amount is entered in the daily journal.

Now it is necessary to have full information as to just what the money is taken in for or paid out for. And since it is impractical to have columns for every kind of transaction, sales and purchases are broken down into "accounts," such as "labor," "parts," "towing," "batteries," "battery charging," etc. And each one of these is given a number.

When an amount is entered in the daily journal, alongside of it will be placed a number. Thus there may be an entry of a receipt of \$2.00, and along with this will be a number. The number is that of "towing."

Now all these accounts are taken care of in separate books or journals, prepared by the accountant at the end of the month. The daily journal is turned over to him, and he goes through it and breaks down the figures into the different departments. Then he prepares a statement of the condition of the business, with each department showing the amount of business done, and the profit or loss.

When a job comes into the shop, Mr. Hahn takes a Chilton Flat Rate Manual and figures out his estimate of the cost, which he gives to the customer. While the job is being done, the mechanic itemizes the parts on the work sheet and the time he puts in. As mentioned before, the information

on these work sheets is then entered into the daily journal under appropriate headings.

Hahn declared that if such controls aren't used, jobs often get out of the shop without being billed, monthly statements are often not sent out, and the garage man never knows his costs.

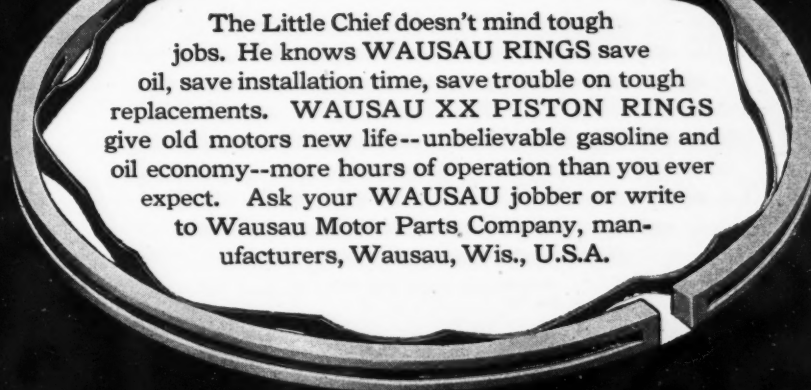
Through using a complete book-keeping system, Hahn knows that customers are billed right, and he knows what his costs of doing business are. If he gives a customer a price, say, on a valve job, he knows that there is going to be a profit on it. He also knows from the time stamped on the work sheets whether the mechanic has

spent the proper amount of time on the job.

"After all," said Mr. Hahn, "the main things a garage has to sell are parts and labor hours. If the garage man isn't making any money off these, he'd better get out of business."

"With the control we have over income and expenditures, and the checking of the accountant, who knows what to control, we are assured every month that the business we are doing is profitable business. It gives us a picture of our accounts receivable, which stimulates us to get out and collect our bills. And it shows us the income we have to meet our own bills."

GET NO MILEAGE? UGH! DON'T WORRY—  
WAUSAU RINGS FIX IN A HURRY!



The Little Chief doesn't mind tough jobs. He knows WAUSAU RINGS save oil, save installation time, save trouble on tough replacements. WAUSAU XX PISTON RINGS give old motors new life--unbelievable gasoline and oil economy--more hours of operation than you ever expect. Ask your WAUSAU jobber or write to Wausau Motor Parts Company, manufacturers, Wausau, Wis., U.S.A.

WAUSAU MOTOR PARTS COMPANY WAUSAU, WISCONSIN

# Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Divd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE																	CHASSIS						
					No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to-1.)	Displacement Factor	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Type and Make	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension		
1	Bantam.....60	439	75	5.00/15	4-2.2x3.0	7.75	45.6	20-4000	7.00	....	Al	Gear	Als	No	No	Til	Buf	A	Wil	P.Ro	WG	Nb-UP	1/2 Spi	5.87 Tr				
2	Buick.....38-40	1022	122	6.50/16	8-3 1/2 x 4 1/2	30.6	248.0	107-3400	6.15	39.2	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	1/2 Own	4.40 IC				
3	Buick.....38-60	1272	126	7.00/15	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	42.3	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	1/2 Own	3.90 IC				
4	Buick.....38-80	1645	133	7.00/16	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	39.3	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	1/2 Own	4.18 IC				
5	Buick.....38-90	2176	140	7.50/16	8-3 1/2 x 4 1/2	37.8	320.2	141-3600	6.35	38.6	CI	LB	Ala	No	AC	SM	Wal	D	Del	P.Own	Own	m-Spi	1/2 Own	4.55 IC				
6	Cadillac V8-38-60-60S	2085	127	7.00/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	42.8	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	1/2 Own	3.92 IC				
7	Cadillac.....V8-38-65	2285	132	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	135-3400	6.25	42.8	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	1/2 Own	4.58 IC				
8	Cadillac.....V8-38-75	3075	141	7.50/16	8-3 1/2 x 4 1/2	39.2	346.0	140-3400	6.70	39.7	CI	Mor	Ala	No	AC	Str	Wal	D	Del	P.Long	Own	Nb-Mec	1/2 Own	4.58 IC				
9	Cadillac V-16.....38-90	5135	141	7.50/16	16-3 1/2 x 3 1/2	67.6	431.0	185-3600	6.80	....	CI	Mor	Ala	No	Fram	AC	Car	Wal	D	Del	P.Long	Own	Nb-Mec	1/2 Own	4.31 IC			
10	Chevrolet HB Master	730	112 1/4	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	35.7	CI	Own	CI	No	AC	Car	Own	D	D	P.Own	Own	m-Own	1/2 Own	3.72 C				
11	Chevrolet.....HA DeL.	796	112 1/4	6.00/16	6-3 1/2 x 3 3/4	29.4	216.5	85-3200	6.25	39.7	CI	Own	CI	No	AC	Car	Own	D	D	P.Own	Own	m-Own	1/2 Own	4.22 IC				
12	Chrysler...Roy. C-18	998	119	6.25/16	6-3 1/2 x 4 1/2	27.3	241.5	95-3600	6.20	39.3	CI°	Mor	Ala	Pur	BA	Car	NS	A	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 IC				
13	Chrysler.....Imp. C-19	1198	125	6.50/16	8-3 1/2 x 4 1/2	33.8	298.6	110-3400	6.20	39.5	CI°	Mor	Ala	Pur	AC	Str	NS	A	Wil	P.B&B	WG	Nb-UP	1/2 Own	3.91 IC				
14	Chrysler Cus.Im.C-20	2295	144	7.50/16	8-3 1/2 x 4 1/2	33.8	323.5	130-3400	6.50	....	Al	Mor	Ala	Pur	AC	Str	NS	A	Wil	P.B&B	WG	Nb-UP	1/2 Own	4.55 IC				
15	De Soto.....S-5	958	119	6.00/16	6-3 1/2 x 4 1/2	27.3	228.1	93-3600	6.50	37.8	CI°	Mor	Ala	Pur	AC	Car	NS	A	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 IC				
16	Dodge.....Six	898	115	6.00/16	6-3 1/2 x 4 1/2	25.3	217.8	87-3600	6.50	38.0	CI	Mor	Als	Pur	AC	Str	NS	A	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 C				
17	Ford.....V8-60	685 1/2	112	5.50/16	8-2.6x3.2	21.6	136.0	60-4200	6.60	30.0	Al	Gear	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	3/4 Own	4.44 Tr				
18	Ford.....V8-85	710 1/2	112	6.00/16	8-3 1/2 x 4 1/2	30.0	221.0	85-3800	6.12	37.5	Al	Gear	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	3/4 Own	3.78 Tr				
19	Graham.....Std., Spec.	1065	120	6.25/16	6-3 1/2 x 4 1/2	25.3	217.8	90-3600	6.70	35.3	Al	LB	Als	No	Bur	Mar	Old	D	Wil	P.Long	WG	Nb-UP	1/2 Spi	4.27 C				
20	Graham S.c., Cus.S.C.	1290	120	6.25/16	6-3 1/2 x 4 1/2	25.3	217.8	116-4000	6.70	....	Al	LB	Als	Fram	Bur	Mar	Old	D	Wil	P.Long	WG	Nb-UP	1/2 Spi	4.27 C				
21	Hudson.....112	755	112	6.00/16	6-3x4 1/2	....	175.0	83-4000	....	....	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 Rs				
22	Hudson-Terrapl.....81	864	117	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	38.0	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 Rs				
23	Hudson-Terrapl.....82	915	117	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	37.5	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 Rs				
24	Hudson, 6.....83	984	122	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	36.7	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 Rs				
25	Hudson.....8, 84, 5, 7	1060	122, 129	6.50/16	8-3x4 1/2	28.8	254.5	122-4200	6.25	41.2	CI	GED	Al	No	AC	Car	Old	A	Nat	P.Own	Own	Nb-Spi	1/2 Own	4.11 Rs				
26	Hupmobile Six.....E	1045	122	6.25/16	6-3 1/2 x 4 1/2	29.4	245.3	101-3600	5.75	42.2	CI	Mor	Als	No	AC	Car	Old	A	Wil	P.B&B	WG	Nb-Spi	1/2 Spi	4.54 C				
27	Hupmobile Eight.....H	1325	125	6.50/16	8-3 1/2 x 4 1/2	32.5	303.2	120-3600	5.80	44.5	CI	Mor	Als	No	AC	Car	Old	A	Wil	P.Long	WG	Nb-UP	1/2 Spi	4.54 C				
28	La Salle.....V8, 38-50	1380	124	7.00/16	8-3 1/2 x 4 1/2	36.4	322.0	125-3400	6.25	40.7	CI	Mor	Ala	No	AC	Car	Wal	D	Del	P.Long	Own	Nb-Mec	1/2 Own	3.92 IC				
29	Lincoln.....V12	(b) 135	136-145	7.50/17	12-3 1/2 x 4 1/2	46.8	414.0	150-3400	6.38	34.3	Al	Ch	Al	Pur	AC	CG	Own	O	Exi	P.Long	Own	m-Spi	FF Tim	4.58 C				
30	Lincoln-Zephyr.....1375 1/2	125	125	7.00/16	12-2 3/4 x 3 3/4	36.3	267.0	110-3900	6.70	40.8	Al	Gear	CS	No	Fram	CG	Own	O	Own	P.Own	Own	m-Spi	3/4 Own	4.44 Tr				
31	Nash Lafay.....3810	850	117	6.00/16	6-3 1/2 x 4 1/2	27.3	234.8	95-3400	5.83	38.4	CI	Whit	Als	No	AC	Str	Wal	A	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.11 C				
32	Nash.....Amb. 6, 3820	1050	121	6.25/16	6-3 1/2 x 4 1/2	27.3	234.8	105-3400	6.00	35.5	CI	Whit	Als	BS	AC	Mar	Wal	A	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.11 C				
33	Nash.....Amb. 8, 3880	1200	125	7.00/16	8-3 1/2 x 4 1/2	31.2	260.8	115-3400	6.00	35.0	CI	Dia	Als	BS	Bur	Str	Wal	A	USL	P.B&B	Own	Nb-Mec	1/2 Own	4.10 C				
34	Oldsmobile.....F-38	967	117	6.50/16	6-3 1/2 x 4 1/2	28.4	229.7	95-3400	6.10	38.4	CI	Whit	Ala	No	AC	Car	Var	D	D	P.B&B	Own	Nb-Mec	1/2 Own	4.37 IC				
35	Oldsmobile.....L-38	1078	124	7.00/16	8-3 1/2 x 3 3/4	33.8	257.1	110-3600	6.20	41.7	CI	LB	Ala	No	AC	Car	Var	D	D	P.B&B	Own	Nb-Mec	1/2 Own	4.37 IC				
36	Packard Six.....1600	1175	122	6.50/16	6-3 1/2 x 4 1/2	29.4	245.3	100-3600	6.52	40.0	CI	Mor	Als	Pur	AC	CG	Old	D	Wil	P.Long	Own	Nb-Mec	1/2 Own	4.54 IC				
37	Packard Eight, 1601, 2	1325	127, 48	7.00/16	8-3 1/2 x 4 1/2	33.8	282.0	120-3800	6.60	41.4	Al	Mor	Als	Pur	AC	Str	Old	A	PD	P.Long	Own	Nb-UP	1/2 Own	(b) IC				
38	Pack. Sup. 8, 1603, 4, 5	2790	127-34-39	7.50/16	8-3 1/2 x 5	32.5	320.0	130-3200	6.50	40.0	Al	Mor	Als	Pur	AC	Str	Old	A	PD	P.Long	Own	Nb-UP	1/2 Own	4.69 IC				
39	Pack. Twelve, 1607, 8	4155	134, 39	8.25/16	12-3 1/2 x 4 1/2	56.7	473.0	175-3200	6.40	45.3	Al	Mor	Als	Pur	AC	Str	Old	A	PD	P.Long	Own	Nb-Spi	1/2 Own	4.41 IC				
40	Pierce-Arrow.....1801	3375	138-147	(g)	8-3 1/2 x 5	39.2	385.0	150-3400	6.40	37.6	Al	Whit	Ala	Pur	AC	Str	Buf	D†	Wil	P.Long	WG	Nb-UP	1/2 Own	4.58 C				
41	Pierce-Arrow.....1802	3895	138-144	7.50/17	12-3 1/2 x 4	58.8	462.0	185-3400	6.40	42.0	Al	Whit	Ala	Pur	AC	Str	Buf	D†	Wil	P.Long	WG	Nb-UP	1/2 Own	4.58 C				
42	Pierce-Arrow.....1803	5015	147	7.50/17	12-3 1/2 x 4	58.8	462.0	185-3400	6.40	40.7	Al	Whit	Ala	Pur	AC	Str	Buf	D†	Wil	P.Long	WG	Nb-UP	1/2 Own	4.58 C				
43	Plymouth.....P5	730	112	5.50/16	6-3 1/2 x 4 3/8	23.4	201.3	82-3600	6.70	36.6	CI°	Mor	Ala	No	BA	BC	NS	A	Wil	P.B&B	Own	Nb-UP	1/2 Own	3.90 C				
44	Plymouth.....P6	803	112	6.00/16	6-3 1/2 x 4 3/8	23.4	201.3	82-3600	6.70	36.2	CI°	Mor	Ala	No	BA	BC	NS	A	Wil	P.B&B	Own	Nb-UP	1/2 Own	4.10 C				
45	Pontiac 6.....38-26DA	916	117	6.00/16	6-3 1/2 x 4	28.3	222.7	85-3520	6.20	37.4	CI	Mor	CHI	No	AC	Car	BH	D	Del	P.Own	Own	Nb-Mec	1/2 Own	4.37 IC				
46	Pontiac 8.....38-28DA	980	122	6.50/16	8-3 1/2 x 3 3/4	33.8	248.9	100-3700	6.20	40.0	CI	Mor	CHI	No	AC	Car	BH	D	Del	P.Own	Own	Nb-Mec	1/2 Own	4.37 IC				
47	Stude. Six & Com.....	965	116 1/2	6.00/16	6-3 1/2 x 4 3/8	26.3	226.0	90-3400	6.00	41.2	CI	Dia	Ly	Fram	AC	Str	Buf	A	Wil	P.B&B	WG	Ru-Th	1/4 Spi	4.55 IT				
48	Studebaker. Pres. 4C	1195	122	6.50/16	8-3 1/2 x 4 1/2	30.0	250.4	110-3600	6.00	41.6	CI	Dia	Ly	Fram	AC	Str	Bur	D	Wil	P.Long	WG	Nb-Spi	1/4 Spi	4.55 IT				
49	Willys.....38	573	100	5.50/16	4-3 1/2 x 4 3/8	15.6	134.2	48-3200	5.70	31.6	CI°	LB	CI	F-O	AC	Til	Buf	A	USL	P.R-B	WG	m-UP	1/2 Own	4.30 C				

**ABBREVIATIONS—General**  
 o—Others also  
 \*—Measured on rim of Flywheel  
 1/2—Semi-floating  
 3/4—Three-quarter floating  
 ††—With clearance of .015 the valve is .004 off its seat.  
 †—Does not include Federal Taxes  
 ‡—Computed on basis of displacement, gear ratio, effective tire

diameter, and weight with normal load.  
 (a) —(1/4 to + 1/2)  
 A—Above (rods removed from)  
 A—After top center  
 AA—Automatic adjuster  
 Ad—Advanced  
 Al—Aluminum  
 Ala—Aluminum, Anode processed  
 Als—Aluminum with struts  
 Au—Automatic  
 (b) —4.36-1601; 4.70-1602

B—Below (rods removed from)  
 B—Before top center  
 Bm—Before marks on vibration damper  
 (c) —1-1/2, 1-3/4  
 C—Conventional  
 C—Cold (Tappet clearance)  
 Ch—Chain  
 CHI—Chrome Nickel Iron  
 CI—Cast Iron  
 CS—Cast Steel  
 (e) —0+ 1/4-0  
 (f) —1/4+ 1/4-0

F—Floating (Piston Pin)  
 FF—Full floating  
 (g) —138 in.-7.00/17; 147 in.-7.50/17  
 H—Hot (tappet clearance)  
 IT—Independent Transverse  
 Ly—Lynite  
 m—Metal  
 M—Mechanical  
 N—Negative  
 Nb—Needle bearing  
 P—Piston (Pin Locked in)

P—Single plate clutch  
 PH—Power operated, hydraulic brakes  
 R—Rod (Pin locked in)  
 RS—Radial Safety Control  
 (r)—Out only  
 Ru—Rubber  
 TC—Top Center  
 Tr—Transverse  
 Var—Various  
 x—At 1000 R.P.M.  
 y—At 2800 R.P.M.



# Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

				RINGS				VALVES					IGNITION					FRONT AXLE														
Service Brake Make and Type	Steering Gear Make and Type	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	No. and Width Comp.	No. and Width Oil	Piston Pin Diameter	Piston Pin Locked in	Head Diameter and Seat Angle				Operating Tappet Clearance	Intake Valve Opens Before or After T.C.		Breaker Points Gap (Ins.)	Timing		Breaker Housing	Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)	Line Number				
								Inlet (Ins.)	Inlet Seat Angle (Degrees)	Exhaust (Ins.)	Exhaust Seat Angle (Degrees)		Stem Diameter (Ins.)	Inlet		Exhaust	Inlet Tappet Clearance for Valve Timing												No. of Degrees	No. of Flywheel Teeth	Spark Plug Gap (Ins.)	Spark Occurs °TC
OM La	90 Ch-6	2-3/4	1-7/8	2-3/4	1-7/8	3/16	R	1 1/2	30	1 1/2	30	.279	.006	.006	.006	19B	4 1/4 B	.022	.025	2 1/2 B	1B	Au	A	1 1/8	1 1/4	1 1/2	7	5	1/2	0° 9'	1 1/2	1
OH S	112 AC-46	2(c)	2-1/8	2-1/8	2-1/8	3/16	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	113B	5 1/2 B	.015	.025	4B	1 1/2 B	Au	A	2	1.21	6 13/16	N 1 1/2	1 1/2	1/2	0-1/8	3 1/2-4 1/2	2	
OH S	114 AC-46	2(c)	2-1/8	2-1/8	2-1/8	3/16	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	114B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17/16	N 1 1/2	1 1/2	1/2	0-1/8	3 1/2-4 1/2	3	
OH S	114 AC-46	2(c)	2-1/8	2-1/8	2-1/8	3/16	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	114B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17/16	N 1 1/2	1 1/2	1/2	0-1/8	4 1/2-5 1/2	4	
OH S	114 AC-46	2(c)	2-1/8	2-1/8	2-1/8	3/16	R	1 1/2	45	1 1/2	45	.372	.015H	.015H	114B	6B	.015	.025	6B	2 1/2 B	Au	A	2 1/4	1.31	8 17/16	N 1 1/2	1 1/2	1/2	0-1/8	4 1/2-5 1/2	5	
BH S	155 AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/2 B	Ad	A	2.46	2 3/8	7 24	N 3/4-0	1/4-1	1/2-3/4	4° 51'	6	
BH S	155 AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/2 B	Ad	A	2.46	2 3/8	7 25	0-1/8	0-1/8	0-1/8	5° 38'	7	
BH S	170 AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/2 B	Ad	A	2.46	2 3/8	7 25	0-1/8	0-1/8	0-1/8	5° 38'	8	
BH S	180 AC-45	2(c)	1-1/8	1-1/8	1-1/8	3/16	R	1.50	45	1.37	45	.341	AA	AA	AA	8B	1 1/2 B	.015	.027	6B	2 1/2 B	Ad	A	2	1 3/4	11 30	0-1/8	0-1/8	0-1/8	5° 38'	9	
OH O	AC-46	2-1/8	1-3/8	1-3/8	1-3/8	3/16	R	1 1/2	30	1 1/2	30	.341	.006H	.013H	.006	9B	3 1/2 B	.018	.040	5B	2B	Au	A	2 1/8	1 1/2	5 14	1 1/4-2 1/4	1/2-1 1/2	1/4-1/2	7° 10'	10	
OH O	AC-46	2-1/8	1-3/8	1-3/8	1-3/8	3/16	R	1 1/2	30	1 1/2	30	.341	.006H	.013H	.006	9B	3 1/2 B	.018	.040	5B	2B	Au	A	2 1/8	1 1/2	5 14	1 1/4-2 1/4	1/2-1 1/2	1/4-1/2	7° 10'	11	
LH G	145x Ch-J-8	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.014	8B	3 1/2 B	.020	.025	TC	TC	Au	A	2 1/8	1 3/8	5 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	12	
LH G	145x Ch-J-8	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.006H	.010H	.011	2B	3 1/2 B	.018	.025	3B	1 1/2 B	Au	A	2 1/8	1 3/8	6 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	13	
LH G	155x Ch-H-10	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.006H	.010H	.011	2B	3 1/2 B	.018	.025	TC	TC	Au	A	2 1/8	1 3/8	6 20	1-3	(a)	0-1/8	4 1/2-6	14	
LH G	145x A-A-7	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.008H	.010H	.014	8B	3 1/2 B	.020	.025	TC	TC	Au	A	2 1/8	1 3/8	5 20	1/2-2 1/2	(a)	0-1/8	4 1/2-6	15	
LH O	140x Ch-J-8	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.006H	.008H	.011	6A	2 1/2 A	.020	.025	4A	1 1/2 A	Au	A	2 1/8	1	5 15	1-3	1/4-3/4	0-1/8	4 1/2-5 1/2	16	
OM O	150y Ch-H-10	2-3/4	1-3/8	1-3/8	1-3/8	3/16	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2 B	3B	.015	.025	4B	1 1/2 B	Au	A	1.60	1.54	4 15.2	8	1	1 1/8-1 1/2	8	17	
OM O	100 Ch-7	2-3/4	1-3/8	1-3/8	1-3/8	3/16	F	1 1/2	45	1 1/2	45	.310	.013C	.013C	.013	9 1/2 B	3B	.015	.025	4B	1 1/2 B	Au	A	2	1 1/8	5 22	8	1	1 1/8-1 1/2	8	18	
OH R	160x Ch-J-9	2-3/4	1-3/8	1-3/8	1-3/8	3/16	R	1 1/2	30	1 1/2	45	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	4B	1 1/2 B	Au	A	2 1/8	1 1/8	5 15	3-4	1	1/2-1 1/2	7 1/2	19		
OH R	120 Ch-J-9	2-3/4	1-3/8	1-3/8	1-3/8	3/16	R	1 1/2	30	1 1/2	45	.010H	.010H	.012	4 1/2 B	1 1/2 B	.018	.025	4B	1 1/2 B	Au	A	2 1/8	1 1/8	5 15 1/2	3-4	1	1/2-1 1/2	7 1/2	20		
HMG	120 Ch-J-8-A	2-3/4	2-1/8	2-1/8	2-1/8	3/16	F	1 1/2	45	1 1/2	45	.006	.010	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 3/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	21		
HMG	120 Ch-J-8-A	2-3/4	2-1/8	2-1/8	2-1/8	3/16	F	1 1/2	45	1 1/2	45	.006	.010	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 3/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	22		
HMG	120 Ch-J-8-A	2-3/4	2-1/8	2-1/8	2-1/8	3/16	F	1 1/2	45	1 1/2	45	.006	.010	.010	10 1/2 B	4B	.020	.032	TC	TC	Au	A	1 1/8	1 3/8	4 12 1/2	2-3	1-1 1/2	0-1/8	7	23		
HMG	118 Ch-J-8-A	2-3/4	2-1/8	2-1/8	2-1/8	3/16	F	1 1/2	45	1 1/2	45	.006	.010	.010	10 1/2 B	4B	.017	.032	TC	TC	Au	A	1 1/8	1 3/8	7 17 1/2	2-3	1-1 1/2	0-1/8	7	24		
H G	Ch-7	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.341	0.0	.013	.010	2B	3 1/2 B	.022	.027	7B	2 1/2 B	Au	A	2 1/8	1 1/4	6 18	1 1/2	1	1 1/8-1 1/2	8 1/2	25	
H G	Ch-7	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.341	.006	.013	.010	1A	3 1/2 B	.015	.027	7B	2B	Au	B	2 1/8	1 1/4	8 21.5	1 1/2	1	1 1/4	1 1/8-1 1/2	7 1/2	26
BH S	155x AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/2 B	Ad	A	2 1/8	2 3/8	7 25	N 3/4-0	1/4-1	1/2-3/4	4° 51'	28	
OM O	105 Ch-7	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.311	AA	AA	AA	21B	6 1/2 B	.020	.029	7B	2 1/2 B	Au	B	2 1/8	2	12 32	1 1/2	1	1 1/8-1 1/2	7 1/2	29	
OM O	105 Ch-H-10	2-3/4	1-3/8	1-3/8	1-3/8	3/16	F	1.54	45	1.54	45	.311	AA	AA	AA	19 1/2 B	6B	.015	.029	4B	1 1/2 B	Au	A	2 1/8	1.57	5 30	4	3/4	1 1/8-1 1/2	4	30	
BH G	110 A-B-7	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.015	.015	.015	.....	.....	.020	.025	4A	1 1/2 B	Au	A	2	1.42	6 20	1-2	0-1 1/2	0-1 1/2	7	31	
BH G	125 AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.372	.008H	.015H	.015H	.....	.....	.020	.025	4Bm	1 1/2 B	Au	A	2	1.42	7 20	1-2	0-1 1/2	0-1 1/2	7	32	
BH G	125 AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	F	1 1/2	45	1 1/2	45	.375	.015H	.015H	.015H	.....	.....	.020	.025	98m	2 1/2 B	Au	B	2	1.24	7 18	1-2	0-1 1/2	0-1 1/2	7	33	
BH S	146x AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	P	1 1/2	30	1 1/2	45	.008H	.011	(k)	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1 3/8	6 17	0-N 3/4	1/2-1	1/2-1 1/2	4° 51'	34		
BH S	152x AC-45	2-1/8	2-3/8	2-3/8	2-3/8	3/16	P	1 1/2	30	1 1/2	45	.008H	.011	(n)	TC	TC	.015	.030	2B	3 1/2 B	Au	A	2 1/8	1 3/8	7 21	0-N 3/4	1/2-1	1/2-1 1/2	4° 51'	35		
H O	110 AC-103 (z)	2-1/8	1-3/8	1-3/8	1-3/8	3/16	F	1.57	30	1 1/2	45	.340	.007H	.010H	.....	1B	1 1/2 B	.020	.028	6B	2 1/2 B	Au	A	2 1/8	1 1/4	6 15	1 1/2-1 1/2	1/2-1 1/2	(e)	1° 54'	36	
H O	110 AC-103 (z)	2-1/8	1-3/8	1-3/8	1-3/8	3/16	F	1 1/2	30	1 1/2	45	.340	.007H	.010H	.....	1B	1 1/2 B	.015	.028	8B	3B	Au	A	2 1/8	1 1/4	6 16	1 1/2-1 1/2	1/2-1 1/2	(e)	1° 54'	37	
H O	110 AC-103 (z)	2-1/8	1-3/8	1-3/8	1-3/8	3/16	F	1 1/2	45	1 1/2	45	.340	.006H	.008H	.....	30B	12 1/2 B	.015	.028	6B	2 1/2 B	Au	B	2 1/8	1 3/8	8 20	2 1/2-1 1/2					

Following are delivered prices at factory for cars with standard equipment and include all federal taxes with exception of Ford and Lincoln. Optional equipment, state or local taxes, transportation charges and finance charges are extra.

BODY, MAKE AND MODEL		Delivered Price	Shipping Weight	BODY, MAKE AND MODEL		Delivered Price	Shipping Weight	BODY, MAKE AND MODEL		Delivered Price	Shipping Weight	BODY, MAKE AND MODEL		Delivered Price	Shipping Weight	BODY, MAKE AND MODEL		Delivered Price	Shipping Weight				
BANTAM				CHEVROLET (Cont.)				GRAHAM				HUPMOBILE (Cont.)				OLDSMOBILE (Cont.)				PIERCE-ARROW (Cont.)			
Pick-up	465			Spt. Sed., Trk., 4d	750	2845		Standard Coupe	995			Eight Tour. Sed., 4d	1325	3800			Sedan, 2d	1027	3475	Twelve Model 1802 Sedan	3895		
Panel	479			Bus. Coupe, 2d	648			Comb. Coupe	1045			DeL. Tr. Sed., 4d	1365	3800			Tour. Sedan, 2d	1053	3465	Club Sedan	4000	5855	
Bus. Coupe	439			Cabriolet, 2d	755			Sedan, 4d	1065			Cus. Tr. Sed., 4d	1485	3850			Sedan, 4d	1078	3490	Coupe	3895	5855	
Std. Coupe	469																Tour. Sedan, 4d	1104	3480	Conv. Roadster	4000	5800	
Roadster	478			Master De Luxe Series HA				Special Bus. Coupe	1095			LA SALLE					Conv. Coupe, 2d	1160	3530	Club Berline	4155		
BUICK				Sedan, 4d	796	2915		Comb. Coupe	1135			Series 38-50					Formal Sedan	4155					
Special 43				Coach, 2d	730	2900		Sedan, 4d	1155			Conv. Coupe	1420	3735			Sedan, 7 p.	4210	6085	Enc. Dr. Lim	4360	6105	
Sport Sedan, 2d	981	3515		Tn. Sed., Trk., 2d	750	2915						Conv. Sedan	1825	3870			Enc. Dr. Lim	4360	6105	Brunn Town Bro.	6040	6085	
Tour. Sedan, 2d	1008	3520		Spt. Sed., Trk., 4d	817	2940		Supercharger Bus. Coupe	1230			Coupe	1295	3745			Conv. Sedan	4820	5921				
Sport Sedan, 4d	1022	3535		Bus. Coupe, 2d	714			Comb. Coupe	1270			Tour. Coupe	1345	3800									
Tour. Sedan, 4d	1047	3560		Sport Coupe, 2d	750	2870		Sedan, 4d	1290			Tour. Sedan, 4d	1385	3830			Six-1600						
Bus. Coupe, 2d	945	3385															Tour. Sedan, 4d	1175	3525				
Sport Coupe, 2d	1001	3425		CHRYSLER				Custom Super Charger				LINCOLN					Tour. Sedan, 2d	1145	3475	Twelve 1803 Sedan	5015	6125	
Conv. Coupe, 2d	1103	3575		Royal Six				Bus. Coupe	1320			V12-136 in. wb.					Club Coupe	1120	3475	Enc. Dr. Lim	5220	6145	
Conv. Phase, 4d	1406	3705		Bus. Coupe, 2d	918	3090		Comb. Coupe	1360			Conv. Roadster	5300				Conv. Cpe., 2-4p.	1235	3500				
				Coupe, 2d	963	3135		Sedan, 4d	1380			Coupe	5300	5435			Business Coupe	1075	3450				
Century 60				Conv. Coupe								Wilby Coupe	5900	5615			Chassis	810	2485				
Tour. Sedan, 2d	1256	3760		Tour. Bro., 2d	975	3165		<b>HUDSON</b>				Sedan, 4d	4900	5735			<b>Eight-1601</b>			<b>PLYMOUTH</b>			
Sport Sedan, 4d	1272	3780		Brougham, 2d	963	3180						Brunn Vict.	5900	5530			Tour. Sedan, 4d	1325	3650	Six P5 Coupe, 2d	645	2694	
Tour. Sedan, 4d	1297	3780		Tour. Sedan, 4d	1010	3180		112 Coupe, 3p	694								Club Coupe	1270	3500	Sedan, 2d	685	2744	
Sport Coupe, 2d	1226	3690		Sedan, 4d	998	3170		Vic. Coupe, 4p	740			V12-145 in. wb.					Conv. Cpe., 2-4p.	1365	3625	Sedan, 4d	730	2774	
Conv. Coupe, 2d	1359	3815		Conv. Sedan				Sedan	755			Wilby Tour.	5900				Bus. Coupe	1650	3775				
Conv. Phase, 4d	1713	3950		Sedan, 7p., 4d								Jud. Berline	6000	5770			Chassis	1225	3570	<b>De Luxe Six-P6</b>			
Roadmaster 80				Sed. Lim., 7p., 4d				6-83				Jud. Berline	6100	5840						Coupe, 2p	730	2754	
Phase, Conv., 4d	1983	4325						Coupe, 3p., 2d	909	2825		Jud. Berline	6300	5950			<b>Eight-De Luxe-1601-D</b>			Coupe, 2-4p	770	2799	
1645	4245			Imperial Eight				Brougham, 2d	948	2935		Jud. Berline	6900	6010			Tour. Sedan	1540	3685	Conv. Coupe, 2d	850	2964	
For. Sed., Tk., 4d	1758	4305		Coupe, 2d	1160			Brougham, 2d	968	2940		Brunn Cabriolet	7000	6030						Sedan, 2d	773	2814	
Sport Sedan, 4d	1645	4245		Tour. Bro., 2d	1165	3560		Tour. Bro., 2d	985	2880		Brunn Tour. Cab	7200	6070			Formal Sedan	3710	4795	Sedan, 4d	803	2834	
				Tour. Sedan, 4d	1198	3565		Vict. Coupe 2d	955	2805		Brunn Brougham	7000	6120			Tour. Sedan, 2d	2995	4670	Tour. Sedan, 2d	785	2819	
Limited 90				Conv. Coupe				Sedan, 4d	984	3005		Sedan	5100	5880			Tour. Sedan, 7p	1955	4195	Sedan, 4d	815	2844	
Tour. Sedan, 4d	2350	4585		Conv. Sedan, 4d				Tour. Sedan, 4d	1005	3010		Limousine	5200	5970			Eight-1602	2110	4245	Sedan, 7p.	1005	3239	
Lim. Trunk, 4d	2453	4665						Conv. Coupe	1041			Conv. Sed. LeB.	5800	5970			Tour. Lim.			Sedan Lim.	1095		
Tour. Sedan, 4d	2176	4580		Custom Imp. 8				Conv. Bro.	1104			Conv. Sed. LeB.	6000	5780									
				Sedan, 5p.	2295							Wilby Sport Sed.	7000	6030			<b>Super-Eight-1603</b>			<b>PONTIAC</b>			
CADILLAC				Sedan, 4d., 7p.	2295			8-84 De Luxe				Wilby Panel Bro.	7400				Tour. Sedan, 4d	2790	4530	De Luxe Six			
				Sed. Lim., 4d., 7p	2395			Coupe, 3p, 2d	990	3010							Chassis	2090	3300	Bus. Coupe, 2d	835	3180	
V8-Series 60								Brougham, 2d	1028	3115		LINCOLN-ZEPHYR								Sedan, 2d	865	3265	
Coupe, 2p.	1695			DE SOTO				Vict. Coupe, 2d	1031	3060		Coupe, 3p, 2d	1295	3410			<b>Super-Eight-1604</b>			Sport Coupe, 2d	891	3200	
Tour. Sedan, 5p.	1780			Bus. Coupe, 2d	870	3039		Tour. Bro., 2d	1049	3120		Sedan, 4d	1375	3560			Formal Sedan	3710	4795	Cabriolet, 2d	891	3265	
Conv. Coupe, 2p.	1815			Coupe, rumb., 2d				Sedan, 4d	1060	3135		Sedan, 4d	1355	3525			Tour. Sedan, 4d	2995	4670	Sedan, 4d	918	3285	
Conv. Sedan, 5p.	2215			Tour. Bro., 2d	930	3119		Conv. Coupe	1080	3160		Limousine 4d.	1550	3590			Club Sedan	2990	4680	Tour. Sedan, 4d	942	3285	
V8-Series 60-S				Tour. Sedan, 4d	958	3134		Conv. Bro.	1185			Conv. Coupe	1650	3605			Coupe, 5p.	2965	4595	Conv. Sedan, 4d	1310		
*Tour. Sedan, 5p	2090			Tour. Bro., 2d	970	3139		8-85 Custom				Conv. Sedan	1790	3840			Coupe, 2-4p.	2925	4585				
V8-Series 65				Tour. Sedan, 4d	970	3139		Coupe, 3p, 2d	1080			NASH					Conv. Cpe., 2-4p.	3210	4580	<b>De Luxe Eight</b>			
*Conv. Sedan, 5p	2605	4580		Conv. Coupe	1045	3229		Brougham, 2d	1134			Nash-La Fayette					Victoria	3670	4650	Bus. Coupe, 2d	898	3320	
Tour. Sedan, 5p	2290	4540		Conv. Sedan, 4d	1375	3394		Vict. Coupe, 2d	1131			Master					Chassis	2170	3375	Sedan, 2d	934	3395	
T. Sed., 5p. (Div.)	2360	4580		Sedan, 7p., 4d.	1195	3434		Tour. Bro., 2d	1155			Bus. Coupe	770							Sport Coupe, 2d	955	3325	
				Limousine, 7p	1285	3524		Sedan, 4d	1171	3190		Sedan, 2d	805				Tour. Sedan, 7p	3165	4700	Tour. Sedan, 2d	960	3405	
V8-Series 75								Tour. Sedan, 2d	1191	3195		Sedan, 4d	850				Tour. Lim.	3305	4815	Cabriolet, 2d	1057		
Conv. Coupe, 2p	3380	4665		DODGE				Conv. Coupe									Conv. Sedan	3970	4945	Sedan, 4d	980		
Conv. Sed., Trk.	3945	5110		Bus. Coupe, 2d	808	2877		Country Club				De Luxe					Chassis	2230	3430	Tour. Sedan, 4d	1006	3420	
Coupe, 2p.	3280	4675		Coupe, 2d	858	2952		8-87				Cabriolet	940							Conv. Sedan	1353		
Coupe, 3-5p.	3380	4775		Conv. Coupe, 2d	960	3122		Sedan, 4d	1199	3270		A. P. Coupe	860				Twelve-1607						
Town Sedan, 5p	3635	4900		Sedan, 2d	858	2952		Tour. Sedan, 4d.	1219	3275		Sedan, 2d	855				Formal Sedan	4865	5550				
Tour. Sedan, 5p	3080	4865		Sedan, 2d	870	2957		Terraplane				Bus. Coupe	820				Tour. Sed., 4d.	4155	5525				
Tour. Sedan Div.	3155	4925		Tour. Sedan 2d	878	2957						Sedan, 4d.	900				Club Sedan	4255	5520	<b>STUDEBAKER</b>			
Formal Sed., 5p	3995	4865		Sedan, 4d	898	2977		6-81 De Luxe									Coupe, 5p	4185	5415	Six			
Formal Sed., 7p	3995	5105		Tour. Sedan, 4d	910	2967		Coupe, 3p, 2d	789	2725		Nash-Ambassador					+Coupe, 2-4p.	4135	5255	Bus. Coupe, 3p.	875		
Tour. Sedan, 7p	3210	4945		Sedan, 4d., 7p.	1095	3332		Brougham, 2d	822	2820		Six					+Conv. Cpe., 2-4p	4370	5245	Cus. Coupe, 3 p.	900	3060	
Bus. Tr. Sed., 8p	3105	4945		Conv. Sedan, 4d.	1275	3308		Tour. Bro., 2d	843	2825		A. P. Coupe	1015				+Victoria	5230	5355	Club Sedan	955	3140	
Tour. Sedan, 7p	3360	5105		Limousine, 4d.	1185			Vict. Coupe, 2d	835	2780		Sedan, 4d.	1050				Chassis	2950	3910	Cruis. Sedan	965	3190	
Bus. Tr. Imp., 8p.	3260	5105						Sedan, 4d	864	2885		Cabriolet, 2d.	1090				Twelve-1608			Conv. Sedan	1315		
Town Car, 7p.	5115	5175		FORD				Tour. Sedan, 4d	884	2890							Tour. Sedan, 7p.	4485	5600	<b>Commander</b>			
16-Series 90				V8-60				Conv. Coupe, 2d	926			Nash-Ambassador					Tour. Lim.	4690	5860	Bus. Coupe	965	3095	
Conv. Coupe	5440			Tudor Sedan	640	2553		Conv. Bro., 2d.	990			Eight					+Conv. Sedan	5390	5680	Club Sedan	1030	3160	
Conv. Sed., Trk.	6000			Fordor Sedan	685	2579						Bus. Coupe	1120				Chassis	3140	3965	Cruis. Sedan	1040	3215	
Coupe, 2p.	5340			Coupe, 5W	595	2452		6-82 Super				A. P. Coupe	1165						Conv. Sedan	1390			
Coupe, 5p.	5440							Coupe, 3p, 2d	845			Sedan, 2d.	1150				PIERCE-ARROW						
Town Sedan	5695			Standard				Brougham, 2d	878	2865		Cabriolet, 2d.	1240				Eight Model 1801			President			
Touring Sedan	5140			V8-85				Tour. Bro., 2d.	899	2870							Sedan	3375	5675	Cus. Coupe	1120	3335	
Tour. Sed., (Div.)	5215			Tudor Sedan	665	2777		Victoria, 2d	886	2805		Bus. Coupe, 2d	870	3205			Club Sedan	3480	5600	Club Sedan	1185	3400	
Formal Sed., 5p	6055			Fordor Sedan	710	2800		Sedan, 4d	915	2925		Tr. Sed., Trk., 2d	941	3265			Coupe	3375	5645	Cruis. Sedan	1195	3455	
Formal Sed., 7p	6055			Coupe, 5W	625	2678		Tour. Sedan, 4d	935	2930		Tr. Sed., Trk., 4d	967	3285			Conv. Roadster	3480	5590	Model 38			
Tour. Sedan, 7p	5270							Conv. Coupe, 2d	971			Conv. Coupe, 2d.	1										

†—6 Wheel Equipment



# Jump to Profits

## WITH FITZGERALD



### FITZGERALD BULLDOG—A TOUGHER GASKET FOR A TOUGH JOB

Fitzgerald Bulldog Gaskets are especially engineered to withstand the heat and pressure of today's high speed, high compression motors. You can count on them to win you satisfied customers. And you can count on them to build you a volume of profitable business.

Ask your jobber about modernizing your stock through Fitzgerald's complete gasket service—a full line of gaskets and grease retainers; sales and merchandising helps; cabinets, racks and board assortments for better stocking and display . . . The Fitzgerald Manufacturing Company, Torrington, Conn.—Branches, Chicago and Los Angeles—New York Office—Canadian Fitzgerald, Limited, Toronto.

# FITZGERALD GASKETS



THE COMPLETE LINE THAT COMPLETELY SATISFIES

## Gear Shifters

(Continued from page 11)

but the side of the diaphragm which tends to reverse the direction of the movement of the valve. In this way the diaphragm provides a balanced condition and assists in returning the valve to its neutral position in the event that the shift is not completed.

Shifting can be accomplished even though the engine is not running and there is no vacuum, but the shift under such a condition requires greater effort on the part of the operator. When there is no vacuum, valve "K" bottoms and the link "I" pivots on the

valve. Rod "J" is then moved rearward, moving rod "M" and lever "N" to complete the shift.

To adjust the cross shift linkage, move shift lever to the extreme left position. The lever "E" on the transmission cover should then be in its extreme forward position. If not adjust the length of the rod "C" as required.

Unless the linkage of the vacuum control is disassembled or changed there will ordinarily be no necessity for checking or correcting the adjustment of the forward and rearward shift mechanism. If the vacuum line connections are kept properly tightened and the link pivot points are lubricated with light engine oil at regular

intervals, there should be no difficulty with this mechanism. However, in case of difficulty the vacuum connections should first be checked and the mechanism lubricated.

However, to check the forward and rearward shifting linkage, place the gear shift lever in the neutral position. Then adjust rod "F" so that lever "S" to which it is attached is parallel with the dash.

With the piston in cylinder "L" in its mid-position (10 1/4 in. between the extreme rear edge of the cylinder and the shoulder on the rear end of the rod "M") the rod "M" should be adjusted so that the lever "N" is in the neutral position. The neutral position can be determined by moving the lever back and forth.

Bracket "O" should be mounted on the rod "M" exactly 6 13/16 in. from the shoulder at the rear end of the rod. Rod "J" should be adjusted to a length of 14 1/16 in. between clevis pin centers.

After making the foregoing adjustments and the gear shift lever is in the neutral position, the length of the rod "G" should be adjusted to a point where valve "K" is in the neutral position and air is exhausted from both sides of the piston. When this adjustment has been obtained, all the pivot points on link "I" and the center pivot on lever "H" will be on a straight line which is nearly vertical.

Another test can be made with the engine running. Momentarily complete the connection of the vacuum line to the valve. If the piston rod "M" starts to move to the rear, lengthen rod "G" slightly and repeat the test, making sure that the shift lever and the lever "N" on the transmission are in the neutral position, each time.

If the rod "M" moves forward shorten the rod "G." By checking the adjustment in this manner it is possible to accurately center the valve at the neutral point.

## New Tinning Flux

The American Solder & Flux Co., Berkley St. and Wayne Ave., Philadelphia, Pa., has announced a new tinning flux to be known as "Blitz-stone." This new flux is in liquid form, and may be used either as a dipping flux or as a top cover for the surface of the tin bath. A careful selection of raw materials, balancing of the ingredients and the details of manufacture are said to make this product outstanding in its field.

## Cleans and Waxes

A new liquid preparation, which cleans and waxes a car finish in one operation, has been announced by E. I. Du Pont de Nemours & Co., Wilmington, Del.

Known as "Speedy Wax," the new preparation is said to quickly bring out the new luster through the combination cleaning and polishing action.



The only flat rate manual that has flat rate prices on International and Diamond T trucks and 1938 passenger cars is Chilton



## Mathematics

On a wintry afternoon, Professor Keene of Tech High drove into his favorite service station, operated by Johnny Bright, one of the professor's ex-pupils.

"It's getting colder, John," he said, "the weather man announced over the radio this noon that the thermometer would fall below zero tonight. I wonder if I have enough anti-freeze in the radiator?"

"Well, with a new 38 model, it should pay you to be sure. How much anti-freeze have you in the radiator, Professor?"

"I think you put in two gallons when the nights first began to get cold, but I don't believe that is enough for real cold weather."

"Let's see," said Johnny, "according to this chart, the radiator of your car has a capacity of 22 quarts, and you have eight quarts of anti-freeze in it now. That should protect your car in zero weather, but you should have more anti-freeze for severe winter conditions."

"I think," said the professor, "that the car ought to be protected to twenty degrees below zero, in this climate, to be real sure that damage is not incurred."

"According to this chart, the radiator of your car should have  $11\frac{1}{2}$  quarts of anti-freeze for such sure protection, Professor. You have eight quarts of anti-freeze in the radiator now, and you will require  $11\frac{1}{2}$  quarts, so I'll run  $3\frac{1}{2}$  quarts out of your radiator, and replace with  $3\frac{1}{2}$  quarts of undiluted anti-freeze," said Johnny.

"Just a minute!" said the professor. "I thought I taught you better mathematical thinking than that, John, when you were in my classes at Tech! If you remove  $3\frac{1}{2}$  quarts from my radiator, and replace with  $3\frac{1}{2}$  quarts of pure anti-freeze, the radiator solution will not be nearly strong enough to protect my car to twenty degrees below zero, for you are running, not  $3\frac{1}{2}$  quarts of water from the radiator, but  $3\frac{1}{2}$  quarts of solution that contains an appreciable proportion of anti-freeze."

"Gosh, that's so, Professor. How are



**The Old Dutch Mill** a combination service station, restaurant, and tourist camp situated near Omaha, Nebraska. Its unique design has been found effective in attracting customers.

we going to figure that one out?"

"Let's see," said the professor, as he reached in his pocket for an old envelope and a pencil. "Suppose that we let

a = the amount of anti-freeze required in the radiator

b = the amount of anti-freeze now in the radiator solution

c = the capacity of the radiator, which, you say, is 22 quarts, and

x = the amount that we must drain from the radiator and replace with anti-freeze.

"Then our formula should be:

$$x = \frac{a - b}{c - b} \times c$$

"Applying this formula to the problem of my car, we have:

$$\frac{11\frac{1}{2} - 8}{22 - 8} \times 22 = 5\frac{1}{2} \text{ quarts}$$

"In other words, John, you must draw  $5\frac{1}{2}$  quarts from my radiator, not  $3\frac{1}{2}$  quarts, and then fill the radi-

ator with undiluted anti-freeze. Let's see if our calculations are right. If we draw  $5\frac{1}{2}$  quarts from the radiator, we will have left in the radiator  $22 - 5\frac{1}{2} = 16\frac{1}{2}$  quarts of our original solution remaining in the radiator. If 22 quarts of this solution originally contained 8 quarts of anti-freeze, then  $16\frac{1}{2}$  quarts of the solution will contain:

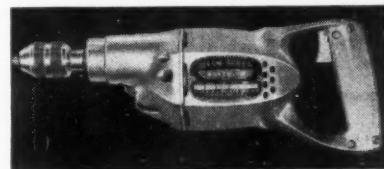
$$\frac{8}{22} \times 16\frac{1}{2} = 6 \text{ quarts}$$

"Now, if we have 6 quarts of anti-freeze in the radiator, and we add  $5\frac{1}{2}$  quarts of anti-freeze, we will have in the radiator, the  $11\frac{1}{2}$  quarts required to protect the car to 20 degrees below zero."

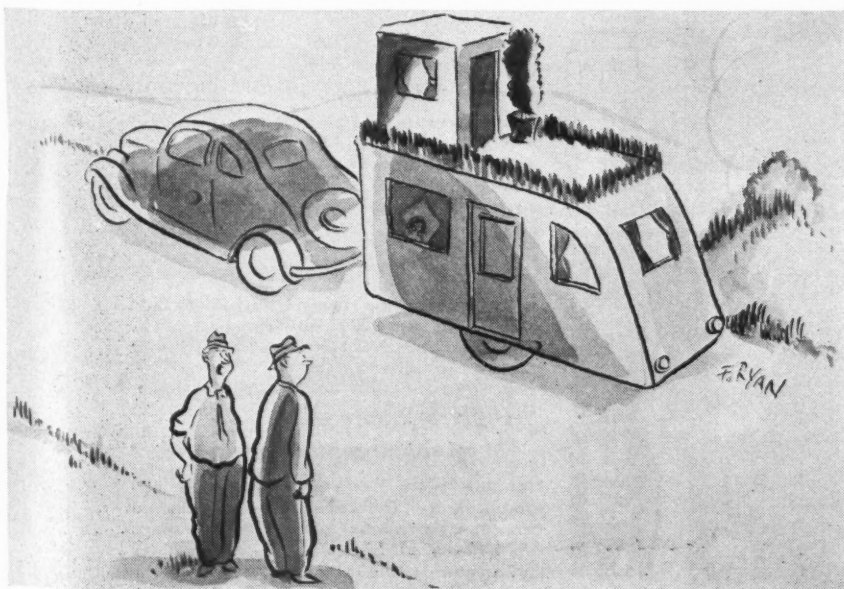
"Well, Professor, I certainly thank you for the post-graduate course! That simple little formula is going to prove to be very useful to me, for my customers often wish to know how much anti-freeze they must add to their radiator solution in order to protect their cars at certain temperatures."

## Low Speed Drill by Black & Decker

A new  $\frac{1}{4}$ -in. low speed drill adapted to stainless steels, Monel and other very hard metals has been announced by Black & Decker Mfg. Co., Towson, Md. This new drill has a standard spindle of 450 r.p.m., a powerful uni-



versal motor, operating through a triple-reduction gear train to provide ample torque for the toughest steel-drilling applications. Armature and spindle are mounted on ball-bearings. The unit is equipped with a "Portomatic" keyless chuck and patented gear locking pin, to facilitate the quick changing of drill bits. Price, complete for all voltages, \$40.00.



"My wife always wanted to live in a penthouse!"

## 3 GRADES OF GASOLINE—3 GRADES OF CAR PERFORMANCE

**GASOLINE BEING TESTED** at the Ethyl Motor Clinic. Three grades of gasoline are tested under the same conditions in a popular make of car. The results of tests like this prove that modern cars have "3 Grades of Performance." Watch for the Ethyl Motor Clinic when it comes to your vicinity.

### HERE'S WHY POWER DEPENDS ON THE GRADE OF GASOLINE YOUR CUSTOMER USES

You'd be surprised to hear some of the "dizzy" ideas auto drivers get about their cars. They even expect top-grade performance from low-grade gasoline. Here's what a man can reasonably expect . . . and why:—



#### *Poor performance with "low grade" gasoline*

There is no anti-knock fluid (containing tetraethyl lead) in "low grade" gasoline. Power is lost because the car dealer *must* retard the spark to prevent "knock" or "ping."



#### *Good performance with "regular" gasoline*

Most regular gasoline has in it anti-knock fluid (containing tetraethyl lead). The spark can be considerably advanced for more power without "knock" or "ping."



#### *Best performance with gasoline containing "ETHYL"*

Gasoline "with ETHYL" is highest in all-around quality. It has *enough* anti-knock fluid (containing tetraethyl lead) so that the spark can be *fully* advanced for maximum power and economy without "knock" or "ping."

**ETHYL GASOLINE CORPORATION**, manufacturer of anti-knock fluids used by oil companies to improve gasoline.



## Helwig Heads District Manager School

A department for the instruction of district managers has just been added to the merchandising curriculum of the Pontiac Motor Division, it is announced by C. P. Simpson, general sales manager.

Norman G. Helwig, who has been associated with General Motors for ten years, will have charge of the work.

Complete instruction and training in all phases of the Pontiac merchandising policy will be provided for new men coming into the company as district managers. Present district managers of whom there are some 150 also will come to the central office in groups to receive the instruction.

Helwig comes to his new assignment from the Midwest region of the company where he headed the business management department.

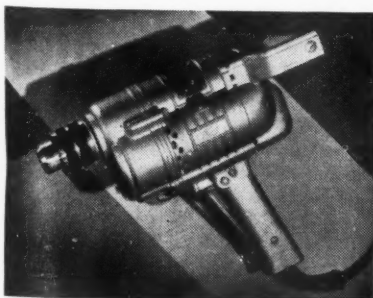
## Stewart-Warner Convention

The Stewart-Warner Corp. held the annual national convention of its Alemite division at the Edgewater Beach Hotel, in Chicago recently. Distributors and their sales forces numbering 350 attended.

According to J. E. Otis, Jr., president of Stewart-Warner, a part of an increased 1930 Alemite advertising budget will be used to cooperate with motor car manufacturers in educating the public to the need of correct lubrication of the high-speed and extreme-pressure mechanisms built into the new-type automobiles.

## Half-Inch Electric Drill

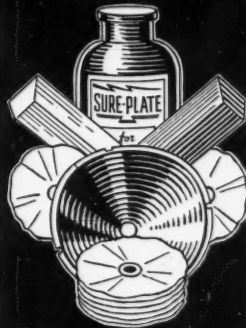
The Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago, Ill., has introduced a new 1/2 in. portable electric drill which is said to have several unusual features. Outstanding among these features is the fact that it is just half the size and weight of former standards for 1/2-in.



drills, and yet does not sacrifice strength or power. The new drill, known as the Thor U44, weighs only 9 lb., and is but 12 in. in overall length. It is designed for heavy-duty service, and can be mounted in a drill stand if desired. It is supplied with either 110 or 220 AC or DC universal motor, has a free speed of 450 r.p.m., and a full load speed of 300 r.p.m. Standard equipment includes 1/2-in. Jacobs chuck, spade handle, lever-type side switch and 10 ft. of three-conductor cable with ground wire.

# SURE-PLATE

A New Low Cost Method of  
Resilvering Reflectors



This handy Sure-Plate Kit, complete in every detail, puts mechanics, super-service stations and dealers in the profitable, fast-growing resilvering business.



Large canvas sign supplied free with each Kit—a vivid display which commands car owner attention.

## Your GOLD Mine of SILVER Dollars

Sure-Plate is a gold mine of silver dollars for merchandising-minded repair men. Get in this virgin field TODAY. Resilver your till by turning dim, tarnished reflectors into bright, safe ones with Sure-Plate.

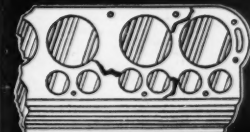
All you need to begin is a Sure-Plate kit, which costs \$12.50. With it you can do \$100 worth of headlight reflector resilver jobs to earn \$3.50 an hour. For every dollar invested you make eight.

Each kit contains 1/2 gallon No. 102 Sure-Plate Solution, 2 fine buffing wheels, 1 coarse buffing wheel, 1 bar of coarse compound, 1 bar of fine compound, and 1 12-oz. bottle of Silver Polish.

See your jobber or write today for full details.

## ... And Don't Forget the Money in SURE-WELD!

The old engine tear downs give way to the new Sure-Weld repairs. For Sure-Weld quickly and permanently seals all cracked valve ports, cast iron or aluminum heads, blocks and water jackets. And more, customers will gladly pay your price for this service. Sure-Weld is unconditionally guaranteed. The \$2.00 pint size is \$1.40 to you. See your jobber or write today for catalog.



For outside or inside block cracks Sure-Weld makes a permanent seal in one hour. Unconditionally guaranteed.

# SURE-WELD

A Guaranteed Liquid Solder for Valve  
Ports, Water Jackets and Cylinder Blocks

----- SURE-RITE PRODUCTS CORPORATION -----  
6010 N. Camac Street PHILADELPHIA, PA.

Gentlemen: If it is as you say, and we can make big money re-silvering headlight reflectors with Sure-Plate, send us complete details at once. We want to get started. Send us the information on Sure-Weld, also.

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ADDRESS .....  
CITY ..... STATE .....  
JOBBER'S NAME ..... ADDRESS .....

## Designed to your Specifications



### The ENGELHARD Exhaustalyser

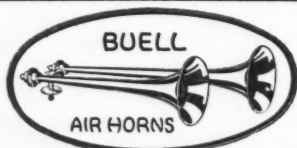
The maintenance man advised us of the features desired. They were incorporated into the design of this new exhaust gas analyser. The instrument meets your conditions.

Send for Bulletin 601

**CHARLES ENGELHARD, Inc.**

90 Chestnut St., Newark, N. J.

Manufacturers of Pyrometers, Resistance Thermometers, Combustion Indicators, Exhaust Gas Analysers, Flue Gas Analysers, Thermocouples.



**POWER to provide SAFETY CONTROLLABLE for COURTESY**

Once you use a Buell Horn you feel insecure with anything less efficient.

Write for Literature on New WAV-A-WAY Light.

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# HY-POWER

## UNIVERSAL HIGH SPEED-LOCK TYPE COILS

*More Zip, Pep and Power*

Only 4 Universal Lock Type Coils that will replace over 30 original numbers! Every Coil in sealed container.

**LION AUTO PARTS & MFG. CO., INC.**  
CHICAGO, ILL.

DALLAS, TEX.



## Grey-Rock Brake Chart

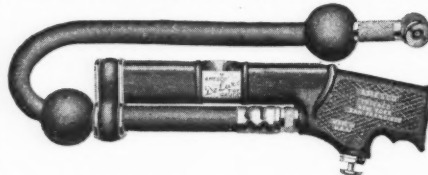
The new brake chart developed by Grey-Rock is entirely new in design and operation. It contains information on the balancing and trouble shooting as well as relining of all types of truck and passenger car brakes. The chart also contains information on the adjustment and reconditioning of hydraulic cylinders and a complete chart on stopping distances as required by various state inspection laws. It also contains complete catalog information showing the proper materials for each type of brake. The brake chart is a development of the United States Asbestos Division of Raybestos-Manhattan, Inc., Manheim, Pa., and is distributed through Grey-Rock jobbers.



**Heavy duty wrecker** built by M. M. Everence at his shop in Champaign, Ill. Will carry 4½ tons on rear boom. Mr. Everence claims that in the past 15 years he has lifted at least 20 horses out of wells and ditches which would have drowned had not his heavy wreckers been available. Cost of truck and wrecker, complete, is \$2,500.

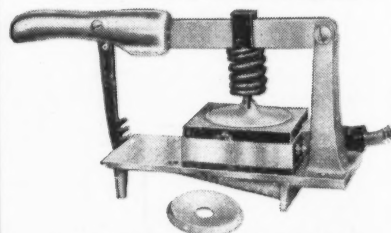
## Tire Gage Is Rubber Covered

The Ames Supply Co., 564 W. Randolph St., Chicago, Ill., has a new end-of-the-line air pressure gage. The gage is rubber covered to make it easier to handle and to absorb shock,



is operated by a single trigger button and is equipped with a clear vision dial. The covering makes the gage weatherproof and sealed against dirt and moisture. List Price, \$8.75.

## MODEL C TUBE PLATE



Practical for all tube repairs, and especially adapted for attaching rubber valve stems to tubes. The only one of its kind the Patent Office has allowed patents on, patent No. 2009549 and 2086866. Costs to operate less than 1/2¢ per hour. Fully guaranteed. Chase Mfg. Co., 3216 Delmar Blvd., St. Louis, Mo.



**WON'T GUM OR STIFFEN EVEN AT 50° BELOW ZERO**  
**USE IT ON YOUR NEXT JOB FOR 100% BRAKING SATISFACTION**

**R. M. HOLLINGSHEAD CORP.**  
CAMDEN, N. J., • TORONTO, CAN.

## A TOAST TO MOTORING JOY

**Sinko**

**SPIN-UR-WHEEL BEZ-L-BALL**



As a toast to motoring joy, offer your car owning customers **Spin-Ur-Wheel**, the convenient aid to parking, backing and turning; and **Bez-L-Ball**, dressy gear lever ball.

**Spin-Ur-Wheel** instantly fits any steering wheel and comes in six popular colors with novelty crystal insert; fluted, oval and pear-shaped styles, with chrome or enamel base.

**Bez-L-Ball** is available in matching colors and designs.

**SINKO TOOL & MFG. CO.**

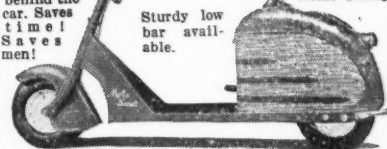
351 N. Crawford Ave., Chicago, Ill.

## PROFIT IN EMERGENCY CALLS

Instead of driving a car, go on a **Moto-Scoot**. Coming back, hook **Moto-Scoot** on behind the car. Saves time! Saves men!

120 Miles per Gallon

\$89.00 up f.o.b. Chicago



**Moto-Scoot**  
219 S. WESTERN AVENUE, CHICAGO

## W. C. Lipe, Inc., Buys Lathe Division of Porter-Cable

The purchase of the lathe division of Porter-Cable Machine Company of this city by W. C. Lipe, Inc., also of Syracuse, announced by H. Follette Hodgkins, head of the Lipe interests. The new ownership is continuing the production of the entire Porter-Cable line, consisting of the 9" Production lathe, the Mechanical Carbo lathe and the Hydraulic Carbo, without specification changes and without any break in manufacturing schedule.



## Pontiac Appoints Braasch to Promotion Post

W. K. Braasch has been appointed sales promotion manager of Pontiac Motors by C. P. Simpson, general sales manager.

Braasch succeeds S. C. Bray, who terminated several years in that position to become the Pontiac dealer in Tampa, Fla.



W. K. Braasch

The new sales promotion manager has spent his entire business life in sales work.

During 1936 he prepared the six sales manuals that were used by Pontiac Motors for the introduction of the 1937 model car.

## Colored Electric Bulbs

If your lighting calls for different colored light bulbs at various points as an essential factor of the signal system, ordinary bulbs may be easily colored by dipping them in gelatin-glycerine solution in which a water-soluble aniline color has been dissolved. The glycerine, because of its unique hygroscopic properties, is added to the gelatin to prevent cracking of the film. Only a little glycerine is needed.

# YANKEE LIGHTING\* MEANS

**SAFETY - ECONOMY - EFFICIENCY**

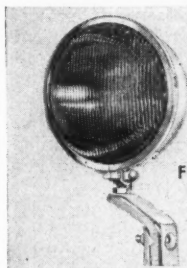
Yankee has been manufacturing automobile lighting devices for over 23 years, and *guarantees* its products against mechanical defects. \*Yankee manufactures all items of lighting equipment required by the I. C. C. Write for illustrated catalog "E" describing other Yankee truck lighting equipment.



CLEARANCE LAMP



DIRECTIONAL SIGNAL



FOG LAMP



REFLEX REFLECTOR

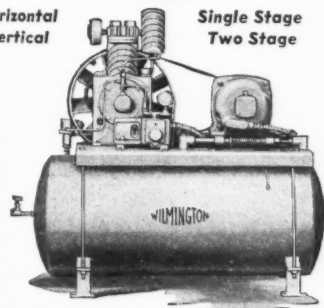


3-IN-LINE IDENTIFICATION LAMP

**YANKEE METAL PRODUCTS CORP.**  
NORWALK, CONNECTICUT, U. S. A.

## Your Air Is Almost Free with

Horizontal Vertical Single Stage Two Stage

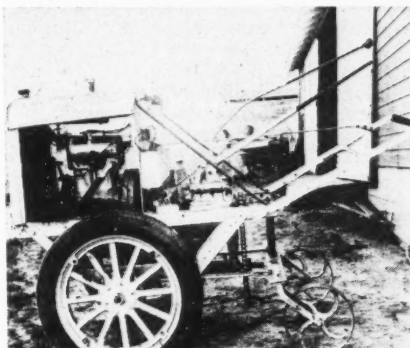


**WILMINGTON COMPRESSORS**

Since 1903

Maintenance costs are so low on Wilmington Compressors that you can begin to believe those "Free Air" signs yourself. These outstanding features are brought to Wilmington Compressors through 34 years of continuous service to the automotive industry: non-pulsating check valve, positive unloader, under-voltage and overload protection for all motors—both single and three phase—Timken Bearings. Write today for your catalog.

**The Auto Compressor Co.**  
S. Mulberry St., Wilmington, Ohio



**Horseless plow.** Cutting a model-T block in half resulted in a two cylinder motor plow for a Nebraska farmer whose farm was too small to warrant keeping a horse. The plow has a top speed of nine miles per hour.

## Weatherhead Improves Display Packages—

The Weatherhead Company of Cleveland, Ohio, has again improved its complete line of containers. All corners of the new packages are strongly reinforced with metal to prevent crushing when packages are stacked. Special attention has been given to strong display of the name of the product on each package.

For counter and shelf display, these new Weatherhead packages make it easy for stock men to quickly select the right package and the repair man to choose the correct part.

## NEW! MUELLER AUTOMOTIVE CLIP KIT



No. 105

A handy assortment of useful clips, battery jumpers and tools for the service station at a bargain price.

SEND FOR NEW MUELLER 1938 CATALOG 706!

**Mueller Electric Co.**  
CLIP MAKERS FOR 30 YEARS  
1590 E. 31st St. Cleveland, Ohio

## CLASSIFIED ADVERTISING

**INVENTORS**—Protect your rights. Before disclosing your invention to anyone send for free blank form "Evidence of Conception" and instructions. Personal attention given all cases. Lancaster, Allwine & Rommel, 415 Bowen Building, Washington, D. C.

Motor Temperature Gauges repaired \$1.50. Missing parts replaced. Originators of this service. Factory Methods. Radiator Shutter Thermostats repaired \$2.50. United Speedometer Repair Co., Inc., 436 W. 57th St., New York City.

**WANTED SALESMAN**—Patented specialty—nationally advertised. A-1 manufacturer. Steady year around seller. Opportunity for real earnings. Address Manager, Dept. 258, P. O. Box 983, Dayton, Ohio.

# Make SHORT WORK OF GRINDING



*...with this  
fast-cutting  
wheel!*

**Y**OU'LL find grinding wheels made by Carborundum cut fast and clean. They're cool cutting, too, so they won't draw the temper of the steel. Carborundum-made wheels make short work of any grinding job. Ask your jobber for Carborundum Brand Silicon Carbide or Aloxite Brand Aluminum Oxide grinding wheels. Be sure to ask for them by name.

Tune in the Carborundum Band, Saturdays at 7:30 P. M.,  
E. S. T., Columbia Chain.

**THE CARBORUNDUM COMPANY**  
REG. U. S. PAT. OFF.  
**Niagara Falls, N. Y.**

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered  
trade-marks of The Carborundum Company.)

**CARBORUNDUM**  
REG. U. S. PAT. OFF.  
**ABRASIVE PRODUCTS**



## Perfect Circle

(Continued from page 46)

Coincidentally, P-C perfected what is known as the "Ferrox" surface treatment. This treatment changes the metallurgical structure of the ring by converting the raw cast iron surface into a black magnetic oxide. It is a process in which the surface grain structure is actually a mild polishing agent, producing a perfect seat by polishing rings, pistons and cylinders and also resulting in prolonging ring life.

A few details of the plants behind the piston ring may be of more than passing interest. Our trip through the P-C plants indicated that even to the casual observer quality controls every step in the manufacturing process.

Quality control starts with a scientific control of raw materials and the ring castings so far as foundry operations go; it extends to close control of every operation in machining and the "Ferrox" treatment. Quality is assured, in the main, by a system of process inspection which is reliable and quite sensitive, supplemented by a series of 100 per cent visual inspection for surface perfection.

As worked out by P-C over a period of many years, the process of piston ring machining has resolved itself into some 14 individual machine set-ups. All of the machinery used for producing P-C rings either is specially designed and built by the company or rebuilt and adapted from conventional machinery.

Without research there can be no technical progress and at P-C research is not only a major activity, but one that is pursued unflaggingly. Thinking in terms of piston rings and cylinders, they look for three elements of engine performance—oil consumption, blow-by and horsepower. These are unailing indices of piston ring performance.

The laboratories are equipped with nine dynamometers for chassis and engine testing. In all cases, the test machines are fitted with meters for checking blow-by.

Supplementing the conventional test equipment, the research department has developed single-cylinder engines designed so as to confine engine operating variables to the cylinder. The cylinders are built with L-head and valve-in-head heads so as to permit the study of both types.

Quite apart from its technical contributions to the motor industry, P-C is distinctive in the possession of a priceless business stability born of its unique environment in which its major activities are located. This fact is emphasized again here because of its unquestioned bearing upon the ability of the company to serve its customers.

### New Book Tells How to Select Motors

A New 24-page book has just been published by Century Electric Company, St. Louis, presenting in helpful form information concerning the electrical characteristics and descriptions of all types of Fractional Horse Power Motors—Repulsion Start Induction, Split Phase, Capacitor, Polyphase, Direct Current—with suggestions as to how they can be most effectively applied to meet the requirements of motor-driven machinery and appliances operating in normal or abnormal surroundings.

## WELD-TITE

GENUINE

THE PIONEER MOTOR WELD

U. S. PATENT MAY 27, 1933



REPAIRS CRACKED CYLINDERS, VALVE SEATS & WATER JACKETS PERMANENTLY.

MADE IN LIQUID AND POWDER FORM.

ALSO MFGS. OF IRON CEMENT, RAD. SEAL, RUST REMOVER, RAD. CLEANER, CARBON AND RUST SOLVENT

**ALL PRODUCTS GUARANTEED 100%**  
**WELD-TITE MFG. CO. CAMDEN, N. J.**

## Announcement

**E. A. STROMBERG**

formerly President of Stromberg  
Motoscope Corp. Now manufacturing and repairing testing instruments for the automotive trade.

**E. A. STROMBERG CO.**  
(not Inc.)

2139-41 W. North Ave., Chicago, Ill.

**Radiator, Battery Repairing and all sorts of soldering jobs easily done with**

**TORIT**

**ACETYLENE  
TORCH No. 23**

Simply connect to Presto tank. Price, including a set of 4 tips, \$6.75. Order from your jobber.

**TORIT MFG. CO.**

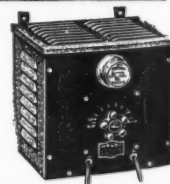
290 WALNUT ST., ST. PAUL, MINN.



**Handy**  
**BATTERY CHARGERS**

LOWER OPERATING COST  
MEANS MORE-PROFIT FOR  
YOU. No. 6-B Wall type.  
6 Battery size. **\$24**  
Price, without bulb.

WRITE for Bulletins on complete line of "HANDY" chargers, testers and racks.  
**BALDOR ELECTRIC CO.**  
(Electrical Mfrs. for 17 years)  
4375 Dumeau Ave., St. Louis, Mo.  
**GUARANTEED for 2 YEARS**



**BLACK &  
DECKER**

World's Largest Manufacturer of

**PORTABLE  
ELECTRIC  
TOOLS**





**WITH  
THE  
KENT  
Pressure  
PAK™**

(for front  
wheel bearings)



● Here's your chance to cash in on the most neglected of all automotive services. An opportunity to become community headquarters for WHEEL BEARING LUBRICATION—the vital service that not one car owner in ten even knows about.

The KENT PRESSURE-PAK is a scientific method of packing front wheel bearings, sold at a cost the smallest operator can afford. The moment a prospect sees it, he is interested. A demonstration clinches the sale. Most important, you do a thorough job so quickly it becomes one of your most profitable services.

Extremely simple in operation. With the bearing locked in place, you may either (1) apply the lubricant direct from a hand or power gun, through the upper fitting; or (2) stock the grease chamber with wheel bearing lubricant and apply air chuck end of tire hose to the lower fitting. In either case, the lubricant forces out the old grease and pressure-packs every crevice of the bearing with fresh, clean lubricant. Casual prospects become regular customers.

The KENT PRESSURE-PAK pays for itself not once but many times each year. LOW in cost—thousands in use. Order from your wholesaler or write for folder.



● The STANDIX LUBE DISPENSER handles bulk or canned lubricant. Fast, safe, sure.

● TURIVAC—the low-cost air-line vacuum cleaner that does a better job than costly units.



**THE LUBRICATION CORPORATION**  
910 South Michigan Avenue, Chicago, Illinois



● Ask about IGNITION-ITE the sensational method of SEALING THE IGNITION against moisture or power leaks.

## Bee Line Opens New Alignment School

The Bee Line Company has opened an Alignment School in Knoxville, Tenn. The school is completely fitted with the most modern Bee Line service equipment. Those attending will become acquainted with every phase of checking and correction methods on all work, including frame and axle straightening.

Anyone desiring to take the Bee Line Course, may arrange for enrollment by addressing Mr. E. S. Stoberg, 407 N. Gay Street, Knoxville, Tenn., or The Bee Line Company, Davenport, Iowa.



**Won't advertise,** says Martin McBohin of White Plains, N. Y. He is pointing to the adhesive tape he plastered over the legend "New York World's Fair—1939" which appears on the New York 1938 license plate. Arrested for defacing the plates, he has hired a lawyer to defend his contention that he can't be forced to carry advertising.

## New Cotton Cord for Tires

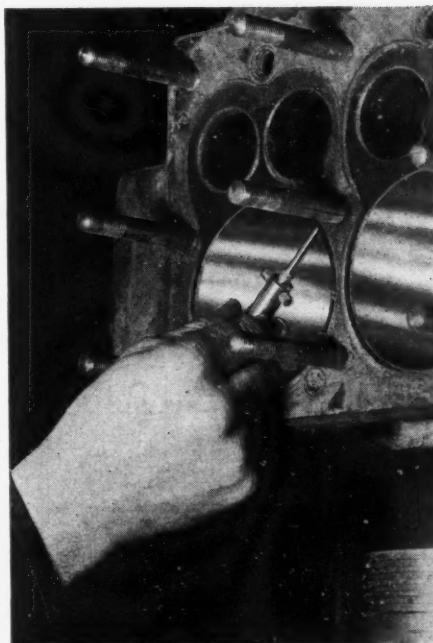
Development of "heat resistant" cotton cord for use in heavy-duty automobile tires has been announced by William D. Anderson, president, Bibb Manufacturing Co., Macon, Ga.

Patents have been issued to three members of the textile organization, Russell B. Newton, superintendent of the Columbus, Ga., plant; E. C. Gwaltney, acting agent at Columbus; and Leon A. Craybill, chief technologist, with headquarters in Macon.

"Essential gums and waxes of the cotton fiber," a company statement said, "are fused and bonded together in the process of manufacturing."

## P&D-OKONITE SELLING MERGER

The Okonite Company, NewType Automatic Division, Passaic, N. J., announce a selling merger whereby the entire line of NewType Wire-Cable and Tape will be handled exclusively throughout the world by the P & D Mfg. Co., Inc., 19-02 Steinway Street, Long Island City, N. Y.



## Get It With A STARRETT No. 124

Your shop needs a Starrett No. 124 Inside Micrometer. There's no better tool for handling close internal jobs like checking cylinder bores, bushings, rings, etc., or for linear work like setting calipers, comparing gages or checking parallels. No. 124 is designed to give a lifetime of satisfactory service. It has interchangeable anvils to cover a wide range of diameters and lengths plus hardened contacts and a simple wear adjustment to keep it accurate. Your tool dealer can supply it in the sizes you want from 2 to 8 inches up to 2 to 32 inches.

Write for Starrett Automotive Tools Booklet "G." It describes the complete line of Starrett Tools for automotive repair work and tells how to use them profitably. Free on request.

## THE L. S. STARRETT CO.

World's Greatest Toolmakers  
Manufacturers of Hacksaws Unexcelled  
Steel Tapes—Standard for Accuracy  
Dial Indicators for Every Requirement  
**ATHOL, MASS., U. S. A.**



# Use Starrett Tools

# NOW...

## the New 1938 Model

# ACE-HY

## HYDRAULIC

# BUMPER JACK

## Is Selling

# FASTER

## THAN EVER!



Pat'd  
Dec. 15,  
1936.  
Other  
Pats.  
Pending.

Its new, bright ZIN-O-LITE specification plating finish, its neat trim of bronze lacquer, insure against rust... and add "eye-appeal". Its improved internal construction makes it more efficient—easier to operate.

### DEALERS EVERYWHERE

report that ACE-HY is the fastest selling jack on the market... because it's so practical—so much more convenient... so easy to use.

It's the modern jack for the modern car... no kneeling... no crawling under car... no projecting levers... nothing to lose or put together.

**SHOW HOW EASY IT WORKS**  
**SEE HOW EASY IT SELLS**

**List Price \$7.50**

PACIFIC COAST & CANADA  
SLIGHTLY HIGHER

Ask your Jobber, or Write

# VULCAN

## Manufacturing Co.

SAINT PAUL, MINN.

### Studebaker 1937 Sales Off

Paul G. Hoffman, president of The Studebaker Corporation, reports the sale of 91,509 passenger cars and trucks in the year 1937 compared with 91,968 in 1936—a decrease of 487 cars, or one-half of one per cent. For December the figures were 4757 compared with 7577.

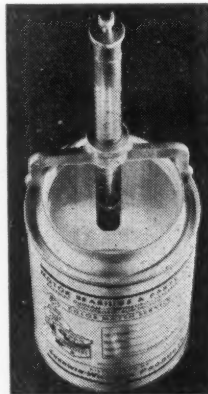
### Measures Color for Mixing

A new device known as the Holmes Depth Gage has been placed on the market by Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland, Ohio.

It consists of a 3-point holder which rests on the edge of a pint or quart can. A hollow tube on which an accurate graduated table is calibrated, dividing pints and quarts into 100 equal parts, forms the center of the gage. Inside the hollow tube are two flashlight batteries and a bulb. On the top of the tube in a screw which makes contact for the bulb to light.

The gage is set for the required proportion of one color, the bulb lighted, and the paint poured into the can. When the required amount has been poured in, the bulb is submerged and appears to go out. Then the tube is raised for the required proportion of the other color, and the process repeated.

The depth gage is being offered free, together with a spray gun adapter and other accessories, with the purchase of an assortment of Sherwin-Williams Opex mixing enamels listing at \$14.65.



### New Lubrication Chart For Ford V-8

A new lubrication maintenance chart for the Ford V-8 car has just been issued by the Service Department of the Ford Motor Company, illustrating by diagram and color pictures every detail in the correct lubrication of that make of automobile.

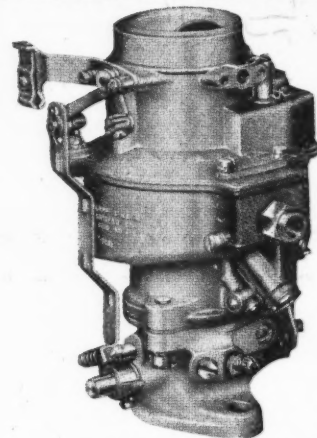
A copy of the chart may be obtained by any garage operator from the Service Department of the various Ford Motor Company branches throughout the country.

### New Specification Book

The new 1938 Bee-Line Specification Book is off the press. This book carries all the specifications for the past ten years, including all 1938 models of passenger cars and trucks, pertaining to car manufacturers' measurements of alignment.

This book is available to dealers at a charge of 75c through The Bee Line Company, Davenport, Iowa.

### LINKERT The World's Outstanding CARBURETOR



An Outstanding New Design for

## CHEVROLET AND PLYMOUTH

LANGSENKAMP-LINKERT CARBURETOR CO.  
INDIANAPOLIS - INDIANA

### WEED AMERICAN BAR-REINFORCED TIRE CHAINS

more than double  
the safety mileage

AMERICAN CHAIN & CABLE  
COMPANY, INC.  
Bridgeport, Connecticut

THUMB-SCREW  
ADJUSTMENT  
BALANCED  
(S-SIDE) PULL  
OVER  
LAPPING  
SEAL



TRADE MARK  
**Noc-OUT**  
HOSE  
CLAMPS

THE HOSE CLAMP WITH  
THE THUMB SCREW

Standard equipment of the automotive industry. Adjustable—one size equals many. Quick tightening. perfect seal. Makes radiators and heaters "Anti-Freeze" tight. Stock up now and be ready for the first cold snap. AT ALL JOBBERS.

**WITEK MFG. CO.**  
4305 W. 24th Pl., Chicago, U.S.A.

Get this FREE Catalog of

## TIME and LABOR SAVING TOOLS

Ask your jobber  
—or write us.

**THE HERBRAND CORPORATION**  
FREMONT, OHIO





● Made only of the best materials . . . by the most modern methods . . . Gardiner Acid-Core Solder assures uniform high quality results on every job. Its quick acting flux permits fast, clean work. Unusually high tensile strength insure lasting bonds.

Produced by modern methods exclusive with this company, Gardiner Solder costs less than "nameless" solders that lack its consistent performance and dependable results. No wonder car manufacturers, body builders, garages and repair shops everywhere standardize on Gardiner year after year.

For maximum satisfaction and economy in Acid and Rosin Core Solders in various alloys and core sizes . . . body, bar and wire solders, or special solders to meet any special requirement . . . specify Gardiner-made products. They're dependable . . . ALWAYS.



PACKED IN  
1, 5, AND  
20-LB. SPOOLS

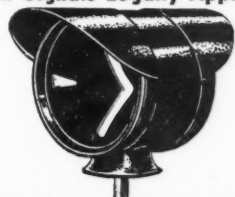


4839 S. Campbell Ave., Chicago, Ill.



**RICH  
VALVES**

Arrow Signals Legally Approved



Demand, insist upon and get this extra Arrow Quality—it costs no more!

**ARROW SAFETY  
DEVICE COMPANY, INC.**  
MEDFORD, NEW JERSEY

## Grille Service

(Continued from page 43)

**OLDSMOBILE.** In this case, the radiator splash shield is a part of the grille, and the entire assembly is removed as a unit. Raise the hood and remove the bolt at the top of the center of the grille, and the two bolts holding the radiator ornament. Reaching down between the core and the grille, remove five bolts on each side holding the grille bars to the radiator support frame. Underneath the fenders there are three bolts holding the splash shield and fender side pan to the upright part of the radiator support frame; remove the two lower bolts—it is not necessary to remove the upper one as it holds the fender side pan only. Remove the four bolts on each side holding the fenders to the radiator splash shield. Then the grille is ready to come out, and can be carried straight forward and up over the front bumper.

## New Brake Lining Offered by Marshall

The Marshall Asbestos Corp., Troy, N. Y., is placing on the market a new brake lining under the name "Bulls-Eye." It is a wire-back, non-rubber, roll lining and comes in sizes up to and including 5 in. x 1/4 in. It is said to have an extremely long wear factor, and to give sure, smooth stops under all conditions. The introductory offer will consist of four assorted rolls, and will include a full size dart board with darts to assist in dramatizing the "Bulls-Eye" name.

## MEMA Election

A. H. Eichholz, Motor & Equipment Manufacturers Association general manager, announces the election by the association board of directors at its meeting on Jan. 11, 1938 of the following officers for the current year: President, Fred G. Wacker, Automotive Maintenance Machinery Company, North Chicago, Ill.; Vice-President, Herbert L. Sharlock, Bendix Aviation Corporation, South Bend, Ind.; Secretary, W. P. Ferris, Blackhawk Manufacturing Company, Milwaukee, Wis.; Treasurer (re-elected), Clyde Park Brewster, K-D Manufacturing Company Lancaster, Pa.

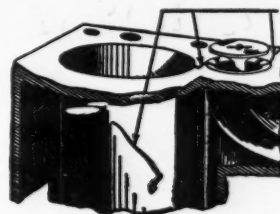
## Philco Starts Drive Against Misfit Aerials

Coupled with the introduction of its 1938 auto-radio line, Philco is inaugurating a drive to make the consumer-public conscious of the "misfit" aerial.

The new Philco auto aerials are designed in conjunction with the new Philco auto radios and are engineered as an integral part of the radio set circuit.

Philco is offering cowl aerials in one, two and three sections for 1938 and also new types of roof and under-car aerials.

## Cracked Engines Cry for WONDER WELD



A new scientific product designed to take the place of the repair shop weld, Wonder Weld is guaranteed to repair cracked valve ports, cylinder cracks as well as cracked water jackets. Follow the directions printed on each can and be sure you get genuine Wonder Weld—you'll know the real product by its orange and black container.

## MILLER Manufacturing Co.

1220 Kaighn Ave., Camden, N. J.

## Don't Be Caught FUEL FOOLISH!

Know the carburetor mixture, fuel pump suction and pressure, muffler back pressure, and acceleration charge of all cars instantly with the **LANOKE MASTER FUEL ANALYZER**. All tests made on the car which assures accuracy under actual operation without removing unit from car. A real asset for your service department.

**Lanagan & Hoke, Inc.**  
Philadelphia, Pa.



**LANOKE**

THE LINE THAT LEADS  
TO PROFITS

## REMCO SHOP EQUIPMENT

Hydraulic Presses, Wrecking  
Cranes, Car Washers, Jacks, Trestles, Creepers, Oil Spray Guns, etc.

Write for FREE literature.  
**THE REMCO PRODUCTS CORP.**  
State & Hay Sts., York, Penna.

# SELL *Guide*

## THE COMPLETE LINE OF AUTOMOTIVE LIGHTING EQUIPMENT



### GUIDE HEADLAMPS

These headlamps for universal application are bullet-type, sturdily constructed, obtainable in either bright baked black enamel or all-chrome finish. Designed for use on passenger cars, trucks, buses, taxicabs and light delivery cars.



### GUIDE FOG LAMP

This new and improved Guide product provides better illumination in fog, snow, rain or dust. Its special optical lens, pre-focused bulb and special bulb shield eliminate reflection from moisture particles. It is the leader in appearance — construction — performance.



### GUIDE DIRECT-SIGNAL LAMPS

These safety signals indicate right or left turns by an arrow in a special amber catadioptric lens which is illuminated when the signal is being operated. The glass lens assures permanent color, clear visibility and long life. The control switch is mounted on the steering column, and an indicator light is located on the switch to show that signals are working.

Everything you or your customers need in automotive lamps for regular and special applications —service parts and lamp testing devices—is included in the Guide line.

The Guide line affords an unusual degree of protection to drivers, and every day it is proving more profitable to the trade.

Moreover, Guide is original equipment on many leading motor cars, trucks and buses, including all General Motors units. There is a large, ready-built market for every dealer and service station selling Guide products.



### SERVICE PARTS

Guide presents a complete line of service parts for all Guide automotive lighting equipment. Attractive display stands, service kits and lamp testing devices are also available.



### GUIDE STIMSONITE REFLECTORS

Specially designed and built for use on passenger cars, trucks, buses and trailers to meet rigid legal requirements. Shatter-proof, dust-proof and waterproof. Back of lens is silver plated to provide maximum reflecting efficiency. Available for flush mounting, bracket mounting and rear stud mounting.



### GUIDE THREE-UNIT IDENTIFICATION LAMP

This new Guide product is scientifically designed for bus and truck use to meet the requirements of the various States. Modernistic in appearance to blend with the most up-to-date truck and bus body designs, it affords increased light output and good visibility. It is easily mounted without the use of tools.



### UNIVERSAL TAIL AND STOP LAMPS

A general-purpose combination tail and stop lamp with adapter bracket for universal mounting. Has two bulbs with special catadioptric Stimsonite reflector-type lens. The tail light bulb can be placed in either regular or inverted position. The lamp is available in either all-chrome finish or baked black enamel with chrome door.

Only a few items in the Guide line of automotive lighting equipment are shown here. The entire line is obtainable from your nearest Authorized Guide Lamp Distributor or United Motors Branch.

# *Guide*

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